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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Reexamination of: Geissler

U.S. Patent No.: 6,987,242

Filing Date: January 16, 2007

Issued To: Illinois Tool Works Inc.

Attorney Docket No.: 8637.62R

Control No.: 95/000,203

Examiner: Linh M. Nguyen

Group: 3992

PETITION PURSUANT TO 37 C.F.R. § 1.182 AND §1.183

Mail Stop *Inter Partes* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

The owner of the above-referenced patent (hereinafter "Owner") requests that the complete declaration under 37 CFR §1.131 by the inventor in a related parent case be allowed as evidence attached to the Appeal Brief filed on October 5, 2009. All but a single page of that declaration is already of record in this reexamination, and apparently a single page was inadvertently omitted from the copy filed earlier in this reexamination. As explained more fully below, the complete declaration was already in the public record. Entering the complete declaration will allow the Board to fully consider the issues in this reexamination, serve the interest of justice, and does not prejudice the third part requester.

Please charge the fee of $400.00, as required by 37 C.F.R. 1.17(f), and any other fee due, to Dep. Acct. 50-0599. A copy of this petition has been served on the Requester by first class US Mail, as indicated on the Certificate of Service filed with the accompanying brief.

10/05/2009 EAREGAY1 00000036 500599 6987242
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BACKGROUND

This inter partes reexamination is one of three reexaminations of patents from a single patent family. The three reexaminations are 95/000202 (USP 6329636); 95/000203 (USP 6987242); 95/000204 (USP 6815639). The patent family includes Appl. No. 09/969535, which had been set to issue on October 14, 2003. At the request of the Applicant, the application was withdrawn from issue to allow consideration of additional art.

During the prosecution of Appl. No. 09/969535 the inventor filed a declaration under §1.131 that established a date of invention of at least as early as February 23, 2000. The declaration included as attachments a circuit diagram, and a directory printout showing that the date of the circuit diagram was February 23, 2000. This declaration was filed on March 26, 2003, in the '535 application in view of cited art USP 6365868, which had a filing date of February 29, 2000.

The Requester cited USP 6365868 in this reexamination and the claims were rejected with USP 6365868 as one of several primary references. Owner's response to that rejection, filed on August 10, 2007, included as an appendix a copy of the declaration from 09/969,535, and argument that in view of the declaration, USP 6365868 came after the date of invention and was not **prior art**. As was later discovered, that copy apparently omitted a page.

Requester commented on Owner's response on September 10, 2007, and, at page 27, discussed the §1.131 declaration filed by the inventor. Requester argued that the circuit diagram failed to show the content of the newly amended claims, but did not challenge the date of the circuit diagram. The Examiner adopted the Requester's position regarding the content of the circuit diagram in an ACP.

Owner's response to the ACP included as an appendix a copy of the §1.131 declaration filed on August 10, 2007, and a discussion of the contents of the circuit diagram. Requester again argued, in comments filed April 17, 2009, that the circuit diagram failed to

show the content of the newly amended claims. The Requester also, for the first time, challenged the established date of the declaration by pointing out that the directory printout showing the date of the circuit diagram had been omitted from the copy filed in this reexamination.

A review of PAIR showed the Requester was correct -- the declaration filed on August 10, 2007 and the copy refiled after the ACP, did not include the page showing the directory printout. The publicly available file history of 09/969535 shows the declaration filed therein did contain the directory printout.

JUSTICE REQUIRES CONSIDERATION OF THE ENTIRE DECLARATION

The entire declaration has been publicly available since its initial filing on March 26, 2003. There are no surprises here -- a document filed in a related case, and freely available to the public, was filed in this reexamination. Indeed, when initially filing the declaration in this reexamination, Owner explicitly stated the declaration was filed in a related prior case, and the declaration itself includes the parent serial number and application data. While a page from that declaration was inadvertently omitted, that page was also readily obtainable by the Requester, the public, and the Office. Moreover, neither the Requester nor the Examiner pointed out the omission when it was first made. Had Requester or the Examiner done so, Owner would have had the opportunity to correct the omission after the ACP. Rather, the omission was first raised by requester after Owner's ACP response, and thus Owner was not able to correct the omission.

There is a strong public interest in a consideration of the entire declaration by the Office. The public has a right to know whether the entire declaration establishes the date of invention, and the public has an interest in having only **prior** art considered in a reexamination.

Justice requires that Owner be fully heard, and that the apparent omission of one page from a multi-page document not prejudice the date of invention. An inter partes reexamination is a mechanism to determine the patentability of claims - and to do so in a full and

complete manner. Owner cannot, as would be possible in a typical application, merely file a continuation, and have the entire declaration considered in the continuing application. Given the nature of a reexamination, the Office must either grant this petition so that the merits of the declaration may be considered by the Board, or take the draconian position that the omission of a publicly available page prohibits consideration of the merits.

ENTERING THE ENTIRE PETITION CREATES NO HARDSHIP FOR REQUESTER

The Requester has twice addressed the merits of the declaration – first in Requester's comment filed on Sept. 10, 2007, and then again on April 17, 2009, in Requester's comments after the ACP. Indeed, in the comments filed Sept. 10, 2007 Requester only addressed the merits -- not the date. Thus, Requester has fully and completely been heard on the merits, and may continue to argue its position during the appeal process.

THE EXAMINER HAS CONSIDERED THE MERITS OF THE DECLARATION

The Examiner considered the merits of the declaration in the ACP. Thus, allowing the complete declaration to be filed creates no additional work for the Examiner, nor will it raise new issues. Rather, it will allow the Board to consider the merits of the declaration just as the Requester and the Examiner did.

CONCLUSION

Entering the entire declaration will serve the interest of justice, and create no hardships. Indeed, entering the declaration is the only way to fully consider the merits of this reexamination. Because the missing page was raised for the first time in Requester's comments after the ACP, Owner did not have an opportunity to resubmit the declaration with the missing page. The Examiner and Requester have fully considered the merits of the declaration, and thus entering the entire declaration causes no hardship. Moreover, the entire declaration is and has been publicly available, and is part of the record in the family of patents that includes the patent that is the subject of this reexamination. Thus, for all of these reasons, the entire declaration should be entered and made of record.

A copy of the entire declaration is attached.

Respectfully Submitted

George R. Corrigan, Reg. No. 34,803
Corrigan Law Office
5 Briarcliff Court
Appleton, WI 54915
(920) 954-1099

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#15

Appl. No. 09/969535

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Steven J. Geissler
Appl. No.	:	09/969535
Filing Date	:	October 1, 2001
Title	:	Method And Apparatus For Receiving A Universal Input Voltage In A Welding, Plasma Or Heating Power Source
Group/Art Unit	:	1725
Examiner	:	Shaw, C.
Docket No.	:	ITW 8637.60

Commissioner for Patents
Washington, D.C. 20231

DECLARATION OF PRIOR INVENTION IN THE UNITED STATES
OR IN A NAFTA OR WTO MEMBER COUNTRY
TO OVERCOME CITED PATENT OR PUBLICATION (37 C.F.R. § 1.131)

PURPOSE OF DECLARATION

1. This declaration is to establish completion of the invention of this application in the United States at a date prior to February 29, 2000, that is the effective date of the prior art patent that was cited by the applicant.

2. The person making this declaration is the inventor.

FACTS AND DOCUMENTARY EVIDENCE

3. To establish the date of completion of the invention of this application, a circuit diagram and printout showing the date of the diagram are submitted as evidence.

4. From these documents and/or models, it can be seen that the invention in this application was made at least by the date of February 23, 2000, which is a date earlier than the effective date of the reference.

TIME OF PRESENTATION OF THE DECLARATION

This declaration is submitted prior to final rejection.

5. As a person signing below:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

7. Inventor(s)

Inventor's signature Steve J. Geissler

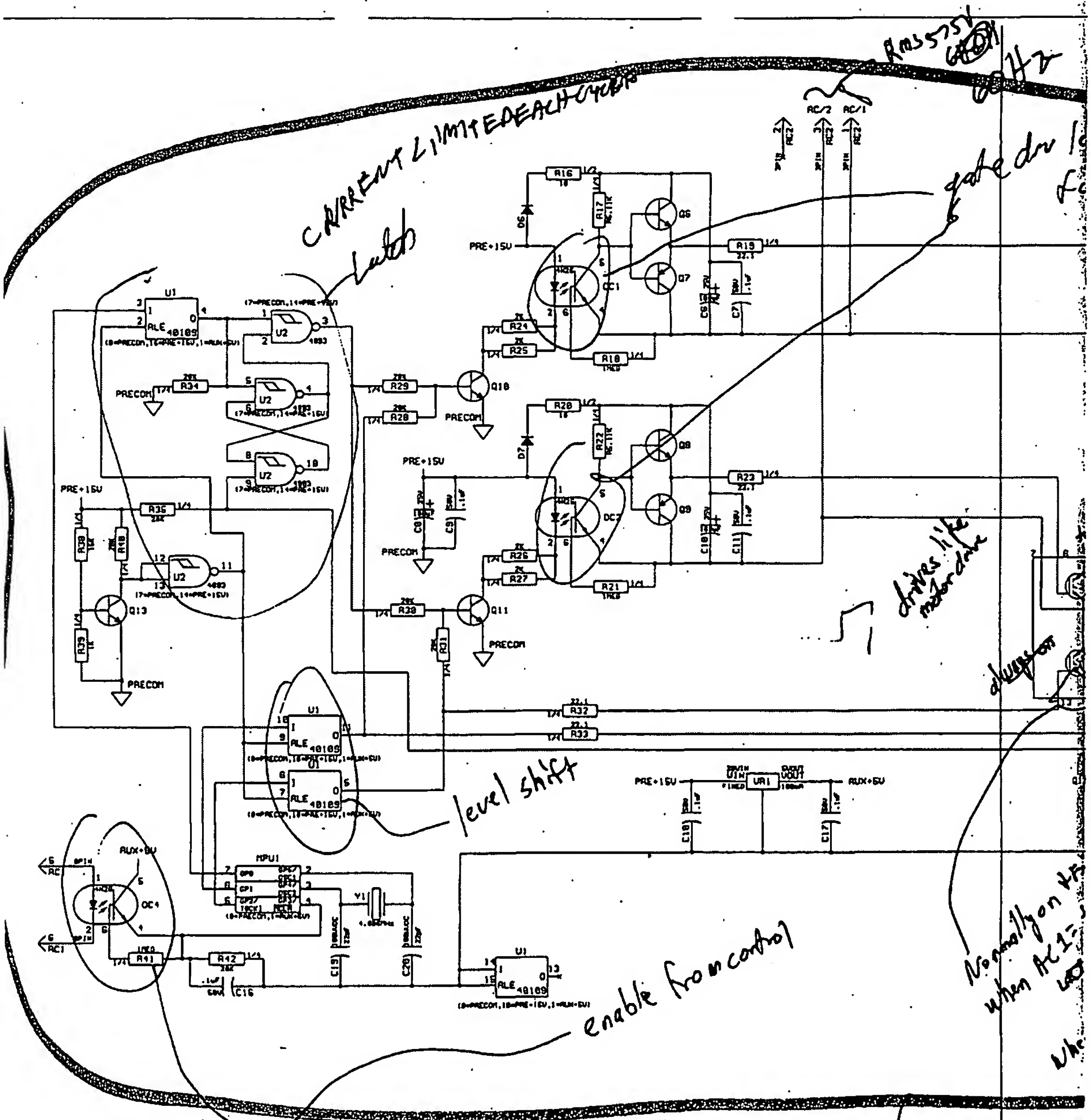
Steven J. Geissler

Date 3-3-2003

Country of Citizenship: United States

Residence: 4713 Overhill Dr
Fort Collins, CO

Post Office Address: (same)

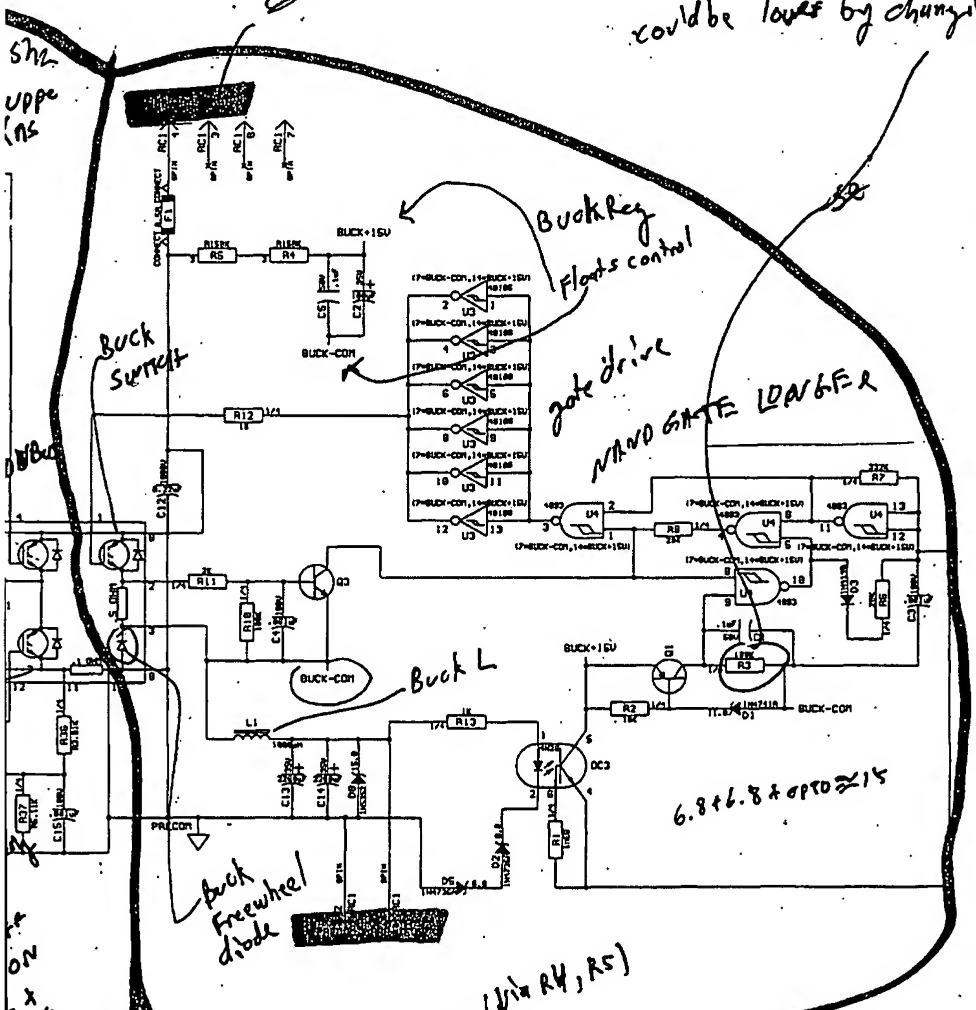


60 Hz.
Aux.

has same peaks 575 (=800) same RMS

POWER/GROUND NETS FOR CHIPS	
MPU1	8=PRECOM, 1=AUX+5V
U1	8=PRECOM, 16=PRE+15V, 1=AUX+5V
U2	7=PRECOM, 14=PRE+15V
U3	7=BUCK-COM, 14=BUCK+15V

could 400 Starts at net line (a. least 200Dc 140 RMS VAC)
could be lower by changing R3 (inc R3 ↓ 200) (or dec R4, R5) 1A



works - power controlled from 800V bus (via R4, R5)

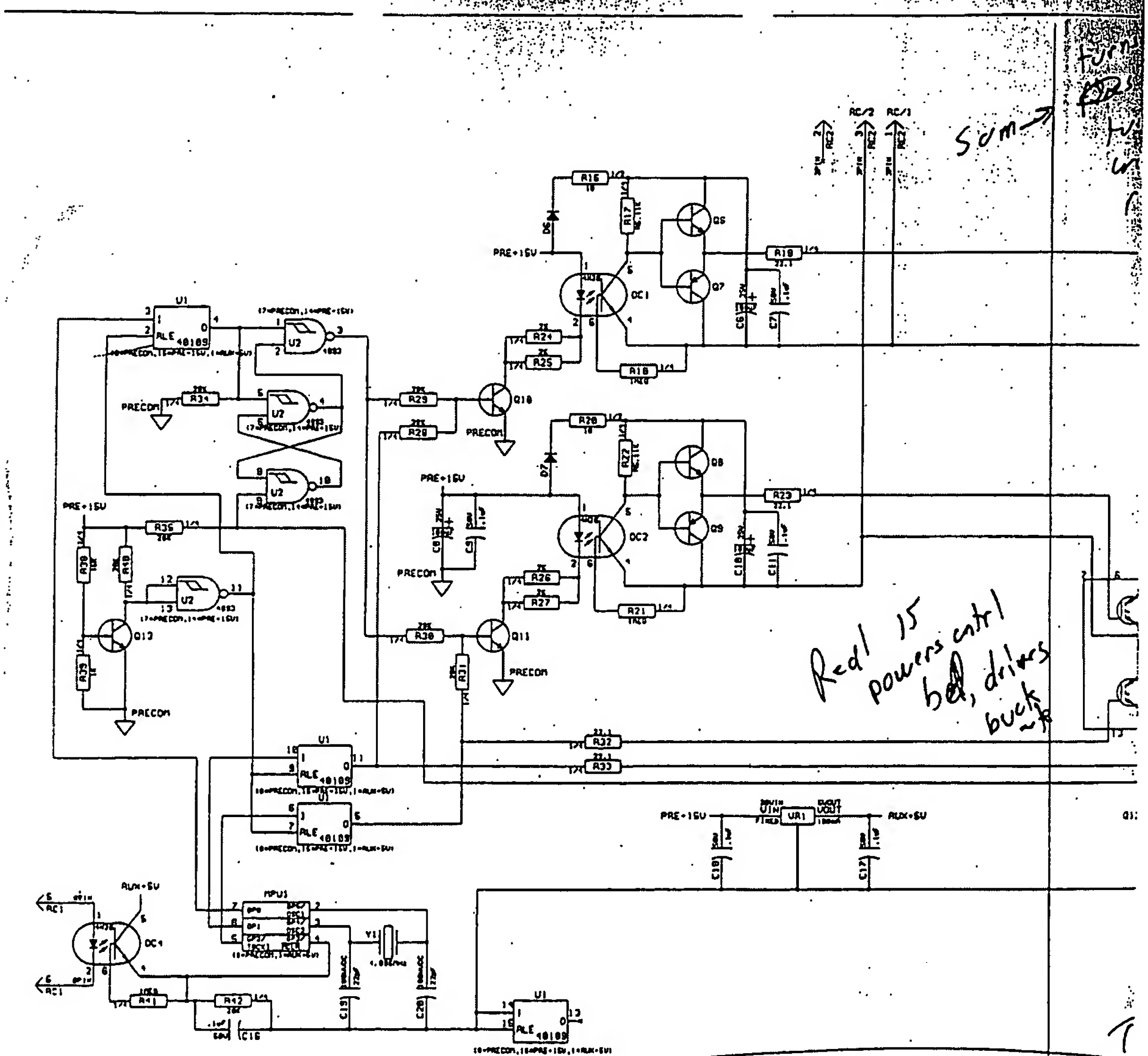
TURNS ON

200-800 VDC to +15V DC Converter

DO NOT USE THIS AREA

REV	DATE	BY	ECO	REVISION DESCRIPTION

MILLER ELECTRIC MFG CO., APPLETON, WI USA			
TITLE CKT, PRINTED WIRING BOARD, AUX 60Hz w/+15V(SEMIKRON-Module)			
DRAWING NOT TO SCALE	CONFIDENTIAL		
INDEX	REPLACES		
DRN BY YOU/ENG DATE MO-DA-YR	SIZE D	DWG. NO. 199425	REV X



Scm

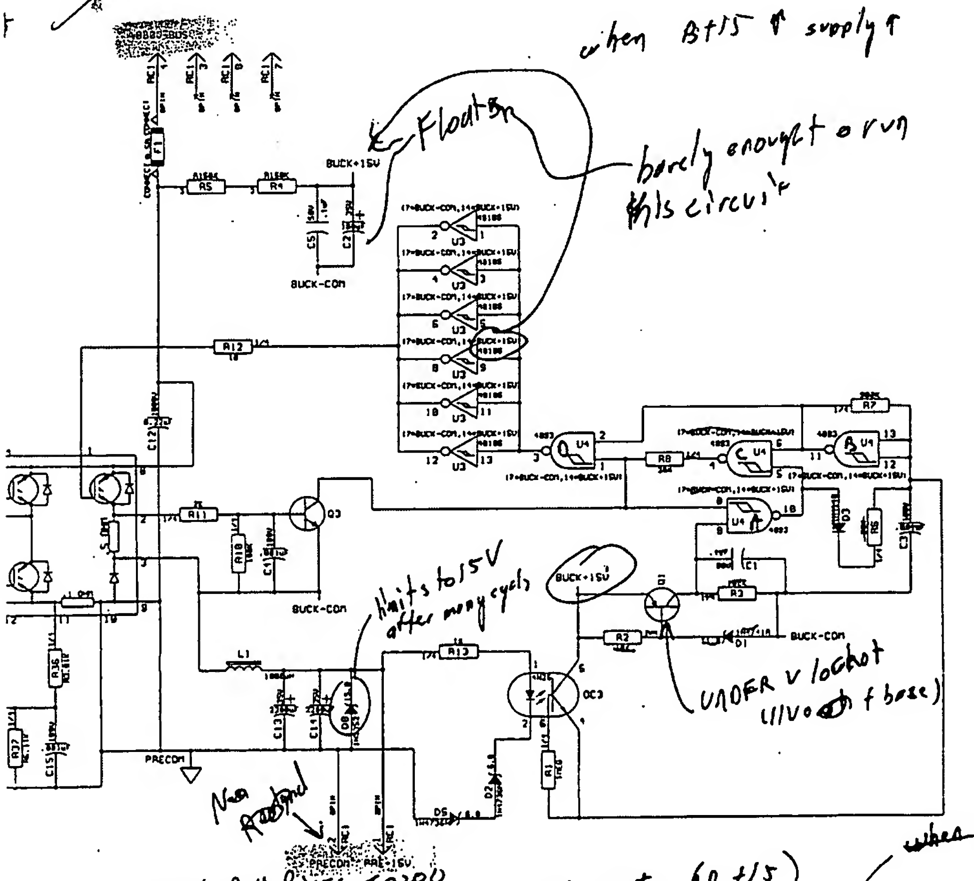
Red 15 powers cntrl bd, drivers buck

Latch released via ~~Q8~~ C4 disch, trips etc

⇒ U43=0
⇒ DRIVE=1

POWER/GROUND NETS FOR CHIPS	
MPU1	8=PRECOM,1=AUX+5V
U1	8=PRECOM,16=PRE+15V,1=AUX+5V
U2	7=PRECOM,14=PRE+15V
U3	7=BUCK-COM,14=BUCK+15V

BS,
ff BS
Repeat until ~~ ~~ C13V = 15 which
OPTO STOPS becaus PIN4OPTO lifts C3 which turns off U43 — smooth, off time get longer then
when B+15 ↑ supply ↑



DO NOT USE THIS AREA

when U4A goes low when lockout ends

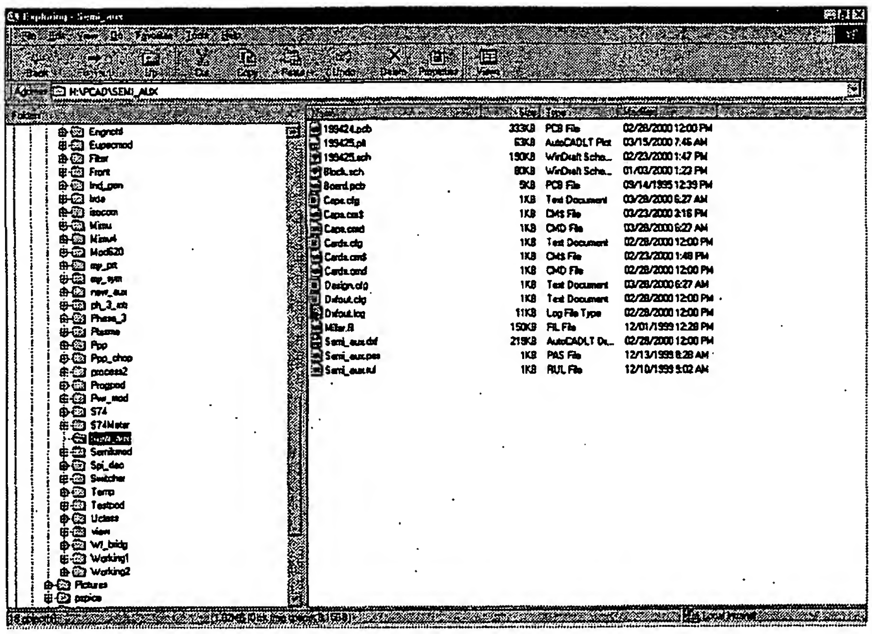
1 ON – 800V Bus Rises to 200
– Bleeding thru R4, R5 raises supply gate (B+15)
– when buck +15 reaches ~11.7 Q1 turns on
– This enable logic
– logic is a timer w/logic

U4A D = 1 at start (lockout)
U4B = 0 at start
DIODE D3 locks into 1 state (B=0)
⇒ U43 = 1 ⇒ TRANS = OFF
WHEN U4A → D C3 discharges, eventually B → 1
~~THEN B=1~~ A=0 latches thru
NOW ENABLED LATCH
U42 = 1, U48 = 1

Gate B RC is long (R7)
AS LII ↑ R11, R10, C4 turns Q3 & turns of Buck switch
when Q3 is on U48 = 0 + U43 = 0
~~when~~ U48 ~~=0~~ → 0, then U410 → 1
when U410 B = 1 → U4E = 0 = 0, latches off

MILLER ELECTRIC MFG CO., APPLETON, WI USA	
TITLE CKT, PRINTED WIRING BOARD, AUX 60Hz w/15U(SEMIKRON-Module)	
DRAWING NOT TO SCALE	CONFIDENTIAL
INDEX	REPLACES
DRN BY YOU/ENG DATE MO-DA-YR · SIZE D	DWG. NO. 199425 · REV X

REV · DATE · BY · ECO · REVISION DESCRIPTION



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Reexamination of:	6,987,242
Control No.:	95/000,203
Filing Date:	January 16, 2007
Title:	Method And Apparatus For Receiving A Universal Input Voltage In A Welding, Plasma Or Heating Power Source
Art Unit:	3992
Examiner:	Linh M. Nguyen
Docket No.:	ITW 8637.62R

CERTIFICATE OF MAILING

I hereby certify that:

a Petition, Petition Exhibit, Appeal Brief, Appeal Brief Exhibits (A-F), and Certificate of Service with respect to the Inter Partes Reexamination of US Patent 6,987,242, Control No. 95/000,203,

is being deposited with the United States Postal Service as express mail in an envelope addressed to:

Mail Stop Inter Partes Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on: Oct. 3, 2009

By:
George R. Corrigan
Reg. No. 34803

*DN*F:\CLF\ITW\8637.62R\8637.62Rcertofmailing2.wpd Thursday, October 01, 2009 1:52PM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In the Reexamination of: Geissler

U.S. Patent No. 6,987,242

Title: Method and Apparatus for Receiving a Universal Input Voltage in a Welding, Plasma or Heating Power Source

Filing Date: January 16, 2007

Issued To: Illinois Tool Works Inc.

Attorney Docket No.: ITW 8637.62R

Control No.: 95/000,203

Examiner: Lihn M. Nguyen

Group No.: 3992

APPELLANT-OWNER'S BRIEF

Mail Stop *Inter Partes* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is filed in support of Appellant-Owner's appeal from the Right of Appeal Notice, mailed July 2, 2009. A Notice of Appeal was timely filed on August 3, 2009. The appropriate fee as set forth in 37 C.F.R. § 41.20(b)(2) of $540.00 and any additional required fees should be charged to Deposit Account No. 500599.

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TABLE OF AUTHORITIES

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MPEP

Control No. 95/000,203

TABLE OF CITED REFERENCES

Primary References

JP '465	JPH1-215465
JP '302	JPH11-77302
Moriguchi '381	US5,926,381
Borowy '868	US6,365,868
EP '088	EP040088
GB '958	GB2258958
DE '906	DE4211906
Moriguchi '110	US5,864,110
Jones '986	US4,533,986

Admitted Prior Art in the '242 Patent

Thommes '741	US5,601,741

Control Power References

Gregorich '046	US5,289,046
Miller '011	US5,465,011
Chambers '024	US4,030,024

Snubber References

McGuire '980	US4,626,980
Noworolski '849	US4,639,849
Vanderhelst '873	US4,849,873
Shekhawat '917	US5,130,917

Slow Switch Converter References

Streit	Streit et al., *High Efficiency Telecom Rectifier Using a Novel Soft-Switched Boost-Based Input Current Shaper.*
Smith	Smith et al., *Properties and Synthesis of Passive, Lossless Soft-Switching PWM Converters.*
Martinez	Martinez et al., *A High Performance Single-Phase Rectifier with Input Power Factor Correction.*

1. REAL PARTY IN INTEREST

The real party in interest for Appellant is Illinois Tool Works Inc., located at 3600 West Lake Avenue, Glenview, Illinois 60025. Illinois Tool Works is the assignee ("Owner") of U.S. Patent No. 6,987,242 ("'242 patent"). The '242 patent issued to Steven J. Geissler and is the subject of this reexamination and appeal, Control No. 95/000,203.

2. RELATED APPEALS AND INTERFERENCES

Concurrently with this brief, Owner's has filed appeal briefs in the *inter partes* reexaminations of two other patents from the Geissler family of patents:

- U.S. Patent No 6,329,636 (Control No. 95/000,202); and
- U.S. Patent No. 6,815,639 (Control No. 95/000,204).

In addition, four patents from Owner's Thommes family of patents, which do not claim priority to the Geissler applications, were the subject of prior reexamination appeals:

- U.S. Patent No. 5,601,741 (Control No. 90/008,369);
- U.S. Patent No. 6,002,103 (Control No. 90/008,368);
- U.S. Patent No. 6,239,407 (Control No. 90/008,371); and
- U.S. Patent No. 6,849,827 (Control No. 95/000,216).

These appeals did not proceed, because the PTO examiner handling the Thommes reexaminations reopened prosecution. In the reexaminations of the '741, '103, and '407 patents, the PTO examiner ultimately confirmed the patentability of the pending claims. Prosecution remains open in the reexamination of the '827 patent.

Another of Owner's Thommes patents, U.S. Patent No. 7,049,546, is the subject of a pending appeal before this Board, Control No. 95/000,205. This appeal was initiated by the third-party requester in this action ("Requester"). Owner filed a response on September 8, 2009.

Collectively, these patents are also the subject of a related litigation filed by Requester on December 13, 2006 in the United States District Court for the Northern District of Ohio, Case No. 1:06-cv-02981. The related litigation has been stayed at Owner's request and remains pending.

3. STATUS OF CLAIMS

Claims 1–59 are subject to reexamination, stand rejected, and remain pending.

The rejections of claims 1-59 are being appealed.

4. STATUS OF AMENDMENTS

Owner amended independent claims 1, 10, 19, 28, 33, and 42 on August 8, 2007 in its Response to the First Office Action, mailed April 10, 2007. The Examiner entered these amendments in the Action Closing Prosecution ("ACP"), mailed February 20, 2009. Owner amended claim 1 on March 18, 2009 pursuant to the Office's holding in ¶ 1 of the ACP. Owner further amended independent claims 1 and 28 on March 20, 2009 in its Response After the ACP. The Examiner entered these amendments in the Right of Appeal Notice ("RAN"), mailed July 2, 2009. Owner never amended claims 2–9, 11–18, 20–27, 29–32, 34–41, 43–59, which remain pending as originally issued.

5. SUMMARY OF CLAIMED SUBJECT MATTER

a. Summary of the Pending Claims

Each of the pending claims of the '242 patent relates to a welding-type power source. For example, as amended during reexamination, independent claim 1 recites:

> 1. A welding type power source capable of receiving a range of input voltages and frequencies [*see, e.g.*, 1:23–51, 3:15–17, FIG.1], comprising:
>
> an input circuit configured to receive an input power signal having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude [*see, e.g.*, 3:19–22, 5:1–11, 6:62–64, FIGS. 1 and 2];
>
> a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude [*see, e.g.*, 5:12–35, FIGS. 1 and 2];
>
> an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input magnitude [*see, e.g.*, 3:24–27, 5:41–48, 7:39–8:6, FIGS. 1 and 3];
>
> a preregulator controller, connected to the preregulator, having a power factor correction circuit, and further having a controller power input [*see, e.g.*, 5:49–6:34, 6:65–7:3, 7:20–38, FIG. 1];
>
> a control power circuit configured to receive the dc second signal and provide a controller power signal to the controller power input [*see, e.g.*, 5:49–6:34, FIG. 1], wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency [*see, e.g.*, 5:54–65];
>
> wherein the control power circuit includes a first set of circuit elements used to derive control power at start up independent of the input magnitude [*see, e.g.*, 8:22–45, FIGS. 4 and 5] and a second set of circuit elements used to derive control power only after start-up [*see, e.g.*, 8:46–9:59, FIGS. 4 and 5];
>
> and providing the control power to a controller configured to control the output power [*see, e.g.*, 5:49–55, FIG. 1].

As an initial matter, the "control power circuit" of the claimed welding-type power supply includes several limitations that the Examiner never properly addressed in this reexamination:

- The control power circuit must "receive the dc second signal and provide a controller power signal." Because the "dc second signal" has a magnitude that is "independent of the input magnitude," the "dc second signal" *cannot* be an unregulated, rectified input.

- The control power circuit must include start-up circuitry or a "a first set of circuit elements used to derive control power at start up independent of the input magnitude."
- The control power circuit must include after start up circuitry or "a second set of circuit elements used to derive control power only after start-up."

Each independent claim includes similar language. Independent claim 10 recites method language that corresponds to the apparatus language of claim 1. Independent claims 19 and 51 both recite a means for converting the dc second signal into control power. The corresponding structure in the specification that performs this function includes start-up and after start-up circuitry. *See, e.g.*, '242 Patent at 8:7–9:51, FIGS. 1 and 4. Independent claim 28 recites a dc bus (*i.e.*, the output of the boost circuit rather than the boost circuit) along with the start up and after start up circuitry. Independent claim 33 recites language similar to that of claim 1. Independent claim 42 recites method language that corresponds to the cited language of claim 1. Therefore, either explicitly or by dependency, claims 1–59 require the control power to be derived from the dc bus.

Furthermore, the Examiner never properly addressed that claims 3–9, 12–18, 21–27, 35–41, 44–50, and 53–59 (as originally issued) require, in addition to claimed control power circuitry, that the "dc second signal" have a magnitude that is "greater than the first magnitude" (*i.e.*, the unregulated, rectified input). *See e.g.*, '242 Patent at 5:12–18, 6:13–17. For these claims, the voltage magnitude of the "dc second signal" or second dc bus must be both (1) greater than the rectified magnitude of the highest input in the range of inputs, and (2) independent of the input magnitude.

b. Background for the Pending Claims

The invention of the '242 patent relates to a power supply for welding, cutting, and heating applications.[1] '242 Patent at 1:23–25. These applications require "substantial power" sufficient to melt metal. *Id.* at 1:39–51. Generally, this requires a welding-type power supply that can convert the available input power to a high-power output. Exhibit A, Lipo Decl. at ¶ 11.

1 Welding, cutting, and heating applications similarly require high-power outputs. '242 Patent at 1:39–51. Although Owner's discussion, herein, focuses mainly on welding applications, the discussion is equally applicable to cutting and heating applications.

The input power available from a utility power grid is a high-voltage, sinusoidal ac signal ranging from 120V to 600V, with a relatively low current as compared to welding currents. *Id.* For example, welding often requires currents between 100A and 1000A. *Id.*; U.S. Patent No. 6,023,037, assigned to Lincoln Global, Inc. ("Requester's '037 patent"), at 2:2–3. Thus, a welding power supply must transform a relatively high-voltage, low-current input signal to a low-voltage, high-current output signal suitable for welding. Lipo Decl. at ¶ 11. As explained below, there are several other characteristics that are desirable in a welding power supply, including portability, the ability to operate over a continuous range of input voltages, and the ability to efficiently supply reliable control power.

i. Before the Development of Owner's Technology, There Existed a Need for Portable Welding-Type Power Supplies That Could Receive a Range of Input Voltages.

(A) Need for Portable Welding-Type Supplies

Although welders are often used in many different locations within a particular jobsite, older welders were not very portable. Lipo Decl. at ¶ 13. This was largely because older welding power supplies were relatively massive. *Id.* at ¶ 14. To produce the required output power, a welding power supply traditionally included a large, heavy, iron-core transformer wrapped with hundreds of turns of copper wire. *Id.* The physical size of the transformer, and thus the power supply, was determined by the number of turns of wire and the cross-sectional area of the core, which are dictated by the voltage being applied, frequency of the primary power, the output voltage requirements, and the output current requirements for welding. *Id.* Because of the size and weight of these iron-core transformers, welding power supplies were generally too large to be readily portable, and thus deemed stationary. *Id.* at ¶ 15. Most dc welding machines also had an inductor that was large and massive, in part because of the primary-power frequency. *Id.* This lack of portability was a significant problem in many industries because often the particular welding job could not be completed at a fixed location, and instead needed to be completed at remote jobsites—*e.g.*, on ships, on off-shore oil rigs, and in buildings high above the ground. *Id.* And while companies developed smaller and lighter power supplies using smaller transformers, the power output of these supplies was often inadequate for many welding applications. *Id.*

The advent of the inverter-type power supply for welding applications was a significant breakthrough in this area. Lipo Decl. at ¶ 16. The inverter-type design allowed Owner to reduce the size of the transformer and inductor in its power supplies without sacrificing welding power performance. *Id.* Rather than supply the low-frequency ac source directly to the primary side of the large transformer, inverter-type power supplies developed by Owner utilized several intermediate power conversions, including a conversion to a high-frequency ac voltage. *Id.* at 17. The converted, high-frequency ac signal allowed for a smaller and lighter transformer. *Id.* By controlling power on the primary side of the transformer and boosting the frequency, Owner has been able to develop and manufacture inverter-type power supplies for Stick/TIG welding that weigh 13 lbs., and an all-in-one MIG welder that weighs less than 50 lbs. *See* Exhibit B, Stanzel Decl. at ¶ 4.

(B) Need for the Ability to Receive a Range of Input Voltages

Arc welders and plasma arc cutters are used in a wide array of industrial and commercial settings, including locations where power is readily available and reliable at various voltage levels, locations where power is readily available but only at a single voltage level, as well as locations where the available power is "dirty" (*e.g.*, the voltage fluctuates over short time periods, thereby causing the welding output to fluctuate). Lipo Decl. at ¶ 18. Dirty power is not reliable and is common in remote areas where the only power source is a generator. *Id.* Even where power is readily available, such as in large manufacturing plants, the available power can still be dirty and unreliable due to a large or varying amount of equipment on the power source. *Id.* Moreover, in international settings, the range of potential input voltage levels and frequencies can vary even more than those available in the United States due to varying standards. *Id.* at ¶ 19. In light of these factors, welding and cutting equipment must be capable of effectively and reliably utilizing a variety of power sources. *Id.*

The development of the portable, lightweight, inverter-type welding power supplies, as discussed above, further highlighted the need for power supplies capable of handling multiple power sources. Lipo Decl. at ¶ 20. With an inverter-type power supply, a welder operator could more easily move the

equipment to different worksites, but the operator still needed a power supply that could handle the multiple input voltages and potentially dirty power conditions available at those sites. *Id.*

Owner developed the technology that allowed welding power supplies to deliver a consistent welding signal over a range of input voltages. *See* U.S. Patent No. 7,049,546 ("'546 patent"). As explained below, this technology, in turn, highlighted the need for an effective way of delivering power to the controller circuitry of the power supply over a range of input voltages.

ii. Before the Development of the Technology Claimed in the '242 Patent, There Existed a Need For the Efficient Delivery of Reliable Control Power Over a Range of Input Voltages.

A controller is an essential component of an inverter-type power supply, which needs its own power input to operate (referred to herein as "control power"). Lipo Decl. at ¶ 24. Upon the development of inverter-type welding power supplies that could be used over a range of input voltages, there was a strong need for consistent and efficient delivery of control power to the controller over the same range of input voltages. *Id.* Before the invention claimed in the '242 patent, multi-input welding power supplies provided control power either by using mechanical contacts, or by adopting basic, voltage-limiting circuitry. *Id.* The '242 patent discloses and claims advances over both prior-art techniques.

(A) A Mechanical-Contact Solution Has Inherent Problems.

Before Owner developed the solution claimed in the '242 patent, inverter-type power supplies that were capable of receiving a range of input voltages often relied on a variety of mechanical contacts to provide a consistent voltage signal to a controller. *See* '546 patent at 5:12–25. This mechanical-contact solution, however, has inherent problems. Lipo Decl. at ¶ 25.

The main problem with a mechanical system is its tiered operation, which is incapable of keeping pace with near instantaneous changes in input voltage. *Id.* at ¶ 26. Generally speaking, a mechanical system includes several contacts, each of which corresponds to a discrete voltage signal. *Id.* For instance, if the input voltage is 230V, the mechanical system will engage the contact associated with a 230V signal. *Id. at ¶27; see also* '546 patent at 8:39–45. But this means that the mechanical system can

only precisely account for discrete voltage levels. Lipo Decl. at ¶ 27. Thus, a given power source providing power at a voltage level between two tap levels could cause an over voltage or an under voltage. *Id.*

For instance, if a power source provides 450V to a system with taps at 380V and 460V, the mechanical system would select the 460V tap level. *Id.* at ¶ 28. But, as described above, the input power can fluctuate over time, especially where the input power source is a generator. *Id.* If a generator supplying power at 450V experiences a sudden drop in voltage to 390V, the mechanical system might associate the input power with a 380V tap. *Id.* If the voltage level then rises to the previous 450V level, the mechanical tap would move back to the 460V tap, but there would be a delay as the mechanical system is slower than the voltage shift, which can happen almost instantaneously. *Id.* This would result in a momentary, but significant, improper voltage supply from the mechanical system that can potentially damage the controller or cause it to malfunction. *Id.* Although it is possible to use an over-voltage protection circuit, the operation of such circuits generally results in a shutdown of the welder (requiring diagnosis, and resulting in lost labor time). *Id.* at ¶ 29.

Moreover, if the input voltage level drops and the mechanical system cannot respond quickly enough, the controller might receive an insufficient voltage that causes it to shut down and stop the welding output. *Id.* Although it is possible to build a delay into the system to prevent the mechanical system from switching taps for a specified period of time, delays are also not desirable. *Id.* For example, a delay could expose the controller to improperly high or low voltages for longer time periods. *Id.*

Furthermore, a mechanical system can be problematic if the welding power supply is jostled or bumped. Lipo Decl. at ¶ 30. This is more likely to occur if the welding power supply is readily portable, because the power supply is more likely to be placed on surfaces that are subject to mechanical vibrations (*e.g.*, in proximity to high-output generator motors or at construction sites) or on surfaces that are themselves moving (*e.g.*, a floating oil rig at sea). *Id.* In such circumstances, the mechanical contacts can be bumped loose, which would result in an improper connection that leads to an improper voltage

supplied to the controller. *Id.* A controller that receives an improper voltage can be damaged if it receives an over voltage, or can turn off because it receives an under voltage. *Id.*

(B) Single Input Technology Would be Wasteful if Adopted in Multiple Input Systems.

In addition to the mechanical-contact solution, it was also known to use a linear regulator to convert a dc bus voltage to a proper control voltage for machines with multiple input voltages. Lipo Decl. at ¶ 31. A linear regulator, however, operates by dissipating the voltage and can cause significant power loss. *Id.* For instance, a linear regulator can convert a 24V bus to a 18V control power signal, which results in a dissipated voltage of 6V. *Id.* If the current through the linear regulator is 1A, then the total power loss is only 6W. *Id.* But if the bus starts at a much higher voltage (as is common in welding power supplies), such as 800V, with the same desired control power voltage of 18V, then the power loss at a 1A current is 782W. *Id.* Not only can such a large power loss cause excessive heat dissipation in the control circuitry, but it also represents an extremely wasteful solution. *Id.*

(C) Solutions Utilizing a DC Bus Require Start-up Circuitry.

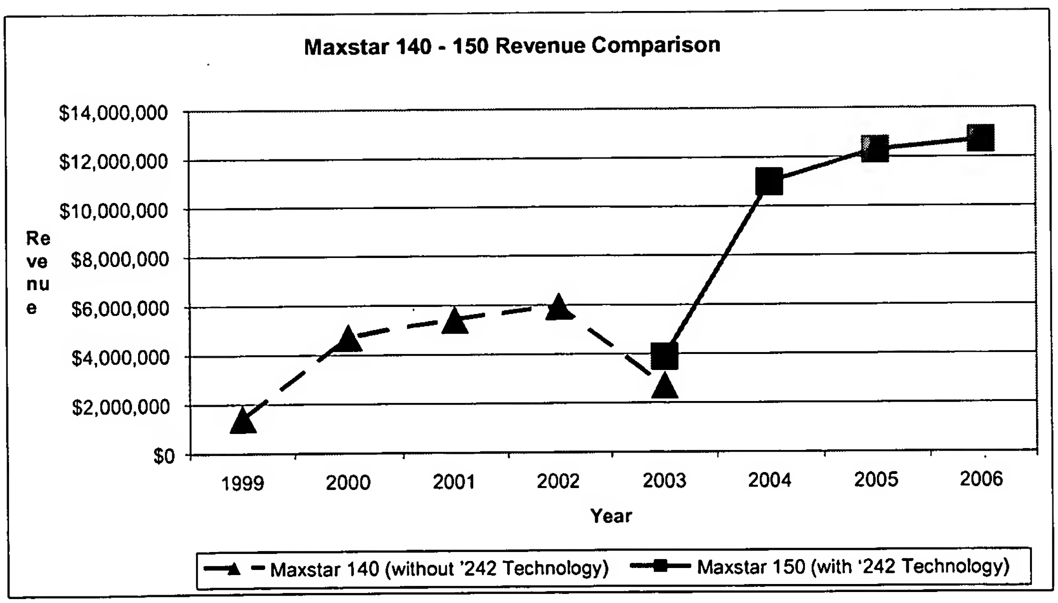
Another solution for providing control power is to efficiently step power down from a known dc voltage, such as a dc bus created from the input power. Lipo Decl. at ¶ 32. If the welding power supply has a dc bus with a magnitude independent of the input,[2] control power could then be derived from the dc bus once the bus reaches its desired magnitude. *Id.* at ¶ 33.

Insulation and isolation issues occur, however, when deriving control power from a high-voltage bus (such as an 800V dc bus created with a boost-type power supply). Moreover, the creation of the dc bus requires the operation of the controller, which properly controls the boost circuit. *See* '242 Patent at 6:6–12. Accordingly, the dc bus requires controller operation, but controller operation requires the creation of the dc bus. *Id.* This creates a "chicken or egg" problem, where the bus cannot be established

2 When stepping down a known dc voltage to generate control power, the step down circuitry would be designed for a single dc bus voltage, and so dc bus voltage would need to remain constant and independent of the input voltage level. Lipo Decl. at ¶ 32. This approach can be problematic when there is a range of input voltages. *Id.* Owner's '546 patent solves this problem by employing a boost circuit that creates a consistent 800V dc bus. *See* '546 patent at 8:3–9.

until there is control power, and control power is not available until the bus is established. Lipo Decl. at ¶ 34. Also, deriving power from the bus at start-up could interfere with precharge circuits used in welding power supplies to limit inrush current.

Therefore, before the development of the technology claimed in the '242 patent, there was a need for an inverter-type power supply that could receive inputs over a range of voltages, wherein the control power supplied was efficient and did not rely on mechanical contacts. Furthermore, there was a need to derive control power efficiently before (as well as after) the creation of a dc bus. The '242 patent solved these problems. As a result, products incorporating the '242 patent's technology were an overwhelming success in the market place. Sales revenues for Owner's Maxstar® 140 product (which did not use the '242 technology) and the Maxstar® 150 (which did) are plotted on the graph below.



See Stanzel Decl. at ¶ 10–11. As this graph demonstrates (and as discussed more fully in section 7.d below), the inventions in the '242 patent have enjoyed unquestionable commercial success, which, together with the other secondary considerations, demonstrate that the '242 patent was not obvious.

6. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

Owner appeals the Examiner's 123 grounds for rejection listed in the RAN at ¶¶ 6–129. As an initial matter, Owner notes that Examiner provided little or no substantive explanation for these rejections, and adopted Requester's arguments wholesale and without comment. Regarding most of the pending rejections, the Examiner listed only a string of citations to Requester's submissions. RAN at ¶¶ 8–129. For simplicity, Owner groups and addresses the Examiner's rejections as follows:

1. The Examiner improperly rejected claims 1–59 under 35 U.S.C. § 103(a) as being obvious based on various combinations of nine Primary References with the so-called Admitted Prior Art (*i.e.,* Owner's Thommes '741 patent), Control Power References, Snubber References, and Slow Switch Converter References. RAN at ¶¶ 6–129.

   a. In rejecting claims 1–59, the Examiner improperly relied on the Chambers '024 or Miller '011 references to supply the claimed control power circuitry. Chambers '024 and Miller '011 are non-analogous art, and either fail to teach or otherwise teach away from the claimed control power circuitry. Moreover, the Examiner failed to articulate any "apparent reason" why one of ordinary skill in the art would have combined the teachings of Chambers and/or Miller with those of the Primary References. Owner addresses these issues in Section 7.a.

   b. In rejecting claims 3-9, 12–18, 21–27, 35–41, 44–50, and 53–59, the Examiner never considered that these claims additionally require a second dc bus with a magnitude that is both greater than the rectified magnitude at all input voltages and independent of the rectified input. None of the cited references, either alone or in combination, teaches the claimed control power circuit and second dc bus. Owner addresses these issues in Section 7.b.

   c. In rejecting claims 1–59, the Examiner improperly relied on Borowy '868, which is not prior art. RAN at ¶¶ 54–61, 130.4. Owner addresses Borowy in Section 7.c.

d. In rejecting claims 1–59, the Examiner failed to consider or address Owner's significant evidence of secondary considerations. RAN at ¶ 130.3. Owner addresses these secondary considerations in Section 7.d.

7. ARGUMENT

a. The Board Should Reverse the Examiner's § 103(a) Rejections of Claims 1–59, Because They Rely Improperly on Chambers '024 and Miller '011.

The Examiner's pending obviousness rejections each rely on the Chambers '024 and/or Miller '011 references to supply the claimed control power circuitry. The Board should reverse these rejections, because the Examiner (i) failed to consider Owner's substantial evidence that Chambers and Miller are non-analogous art; (ii) miscast the Geissler invention as merely providing control power and failed to articulate any "apparent reason" why a person of ordinary skill would have combined Chambers or Miller with the Primary References; (iii) failed to consider that Chambers does not teach the claimed control power; and (iv) failed to consider that Miller teaches away from the claimed control power.

i. The Examiner Erred by Summarily Concluding That Chambers '024 and Miller '011 Are Analogous Art.

Chambers '024 and Miller '011 are non-analogous art that those of ordinary skill would not have considered as applicable to designing welding power supplies. In previous responses, Owner submitted a declaration by Dr. Thomas Lipo (Exhibit A) and detailed the numerous real world considerations that render Chambers and Miller non-analogous. *See* Response to First Action at 24–34; Response After ACP at 9–12; Lipo Decl. at ¶¶ 39–51. The Examiner, however, summarily concluded that Chambers and Miller are analogous without providing any meaningful explanation or addressing any of Owner's substantial evidence to the contrary. *See* RAN ¶¶ 7 and 130.2. Further, the Examiner adopted wholesale Requester's arguments that Miller and Chambers are analogous by disregarding everything that makes these references non-analogous. For at least the reasons below, this Board should reverse the Examiner's unreasoned obviousness rejections.

(A) The Examiner Failed to Provide Any Basis for Concluding that Chambers '024 and Miller '011 Are Analogous.

In rejecting the pending claims, the Examiner failed to provide any basis for concluding that Chambers '024 and Miller '011 are analogous. This is improper especially in light of the unique environment in which the Geissler invention provides control power. *See* Sections 7.a.i.(B)–(C) below.

As the Supreme Court has explained, the first inquiry in any obviousness analysis under 35 U.S.C. § 103 is to determine the "scope and content" of the prior art. *Graham v. John Deere Co. of Kansas City,* 383 U.S. 1, 17–18 (1966). Thus, to properly combine references to show obviousness, an examiner must demonstrate that the references relate to analogous art that is either (1) within the inventor's field of endeavor, or (2) "reasonably pertinent" to problem confronting the inventor. *In re Clay*, 966 F.2d 656, 658–59 (Fed. Cir. 1992). Here, the Examiner does not dispute that Chambers '024 and Miller '011 fall outside of Geissler's field of endeavor, which relates to designing welding power supplies, and so the relevant issue is whether these references are "reasonably pertinent" to the problem confronting Geissler. *See* RAN at ¶ 7, Page 9.

A reference is "reasonably pertinent" *only* if it would have "commended itself to an inventor's attention in considering his [or her] problem." *Clay*, 966 F.2d at 659; *see also* MPEP § 2141.01(a). An examiner, however, may not broadly define the problem confronting the inventor to conclude that a reference is analogous when it would be "inconsistent with real world considerations." *Ex parte Dussaud*, 7 U.S.P.Q.2d 1818, 1819–20 (Bd. Pat. App. & Int'f 1988). Moreover, an examiner may not define "the problem in terms of its solution," because doing so would introduce hindsight bias into the selection of prior art relevant to the obviousness inquiry. *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881 (Fed. Cir. 1999).

In *KSR Int'l Co. v. Teleflex Inc*, the Supreme Court explained that the problem confronting the inventor must be considered not in a vacuum but from the perspective of one of ordinary skill in the art, and recognized that familiar items in one field may have obvious uses in other fields. 550 U.S. 398, 420 (2007). Nevertheless, the Court noted that it is improper, in an obviousness analysis, to take art from one field and apply it to another field if the actual application would have been beyond the level of ordinary skill. *Id.* at 417. The Court further agreed with Federal Circuit precedent that an examiner must provide "some articulated reasoning with some rational underpinning to support a legal conclusion of obviousness." *Id.* at 418 (citation omitted). Applying *KSR*'s principles, this Board recently explained in

Nowlin that an examiner must account for the environment in which a claimed invention operates and the accompanying real world considerations in determining whether a person of ordinary skill would have turned to the cited references to address the problem confronting the inventor. *Ex Parte Nowlin*, No. 2009-0846, 2009 WL 705997, at *5–6 (Bd. Pat. App. & Int'f Mar. 16, 2009).[3]

Here, the Examiner has failed to make ***any*** attempt to address the problem confronting Geissler from the perspective of one of ordinary skill, or address any of Owner's significant evidence that real world considerations render Chambers '024 and Miller '011 non-analogous. *See* RAN at ¶¶ 7 and 130.2. Indeed, throughout this reexamination, the Examiner's reasoning has been limited to an unsupported conclusion that Chambers and Miller are "reasonably pertinent to the particular problems solved by the '242 patent[:] control power generated from high voltage, control power generated without using changing transformer taps, and isolation between high and low voltages." RAN at ¶ 7; ACP at ¶ 7. This is not the articulated reasoning with rational underpinning that *KSR* contemplates. *See KSR,* 50 U.S. at 418. Nor is it proper to broadly define the problem confronting Geissler as one of providing control power without any regard to the environment in which that control power is to be provided. *See Nowlin*, 2009 WL 705997, at *5–6.

As explained below, those of ordinary skill in the art of designing welding power supplies would not have turned to Chambers '024 and Miller '011, because welding power supplies must address unique concerns in a markedly different environment.

3 *Nowlin* illustrates the Examiner's error in this case. The claims at issue in *Nowlin* were directed to a cellular telephone and a method for providing a comfort noise signal in the telephone using a QMF filter bank. *Nowlin*, 2009 WL 705997, at *1. The examiner rejected the claims based on the Swaminathan and Uchino references. *Id.* at *2. Swaminathan related to a digital cellular telephone but did not disclose the QMF feature. *Id.* at *3. Uchino did not relate to a digital telephone system but disclosed the use of a QMF filter bank to generate a signal to test the response of a digital line. *Id.* According to the examiner, Uchino was analogous, because it was broadly directed to a digital communications system. *Id.* at *4. This Board disagreed and explained that the environment in which the claimed invention operated was markedly different from that of the Uchino system such that a person of ordinary skill would not have found Uchino to be from the same field of endeavor or reasonably pertinent. *Id.* at *4–6. Whereas the claimed invention was designed for a cellular telephone system that needed to accommodate signals of *varying* amplitude (*e.g.*, voice), the Uchino system was designed to test a digital line that needed to accommodate only signals of *fixed* amplitudes. *Id.* at *5–6.

(B) The Examiner Failed to Consider That Miller '011 Is Non-Analogous, Because It Relates to UPS Art.

Miller '011 teaches a design for an uninterrupted power supply (UPS) for backing up computer and electronic systems—not for maintaining a welding load—and is not within the proper scope of the prior art. Significantly, those of ordinary skill would not have looked to UPS art to design welding power supplies, because UPS systems have access to a predictable source of control power—a battery—and face markedly different design challenges.

First, the battery of a UPS system is a known, simple, fixed source of power, and those of ordinary skill would have expected the battery would be used for start-up control power. In stark contrast, welding power supplies do not have a fixed source of control power, which in turn creates a strong need for the delivery of consistent and efficient control power over a range of inputs (including fluctuating inputs)—a need that the Geissler invention addressed. Lipo Decl. at ¶ 24. Because designers of welding power supplies would have expected the battery of a UPS to be the source of control power, they would not have looked to Miller '011 in the first place.

Second, UPS systems incorporate heavy batteries that are not desirable in a welding power supply. Indeed, excess weight is one of the problems facing designers of welding power supplies, particularly when designing a portable welding power supply to accept a range of inputs as Geissler contemplated. Lipo Decl. at ¶¶ 13–15; '242 Patent at 1:30–33, 3:3–4. Thus, one would have naturally turned away from solutions offered by heavy prior art such as Miller '011.

Third, those of ordinary skill would not have considered UPS references to be applicable to welding, because welding power supplies and UPS systems are designed for different purposes. Lipo Decl. at ¶¶ 47–51. A multi-input welding power supply must provide a desired, welding, current-voltage output curve that is independent of the input. *Id.* Thus, when receiving unreliable or fluctuating (dirty) power, the welding power supply continues to derive the desired welding output *from* the dirty power. *Id.* at ¶¶ 18–19, 49. Conversely, a UPS system drops off the line and switches to a battery backup in the event that utility power is interrupted or dirty in order to mimic the preexisting utility power. *Id.* at ¶ 49.

Designers of welding power supplies would not have expected a UPS circuit to receive multiple utility inputs, in part because they would not have expected a UPS to be moved from location to location. Lipo Decl. at ¶ 50. Moreover, even if a UPS were designed for multiple inputs, its purpose is to provide an output that varies with and mimics the input. *Id.* Conversely, a welding power supply does not mimic the input, and instead creates an output curve that is independent of the input (even if the input power is "dirty") and unique to the demands of welding applications.[4] *Id.* at ¶¶ 18–19, 50. Because these problems are so different, designers of welding power supplies would not have looked to UPS prior art such as Miller '011. *Id.* at ¶ 51.

Again, however, the Examiner erred by failing to address any of these considerations that demonstrate that UPS references such as Miller '011 are non-analogous. Nor does the Examiner's unreasoned and wholesale adoption of Requester's arguments remedy this error. *See* RAN at ¶ 130.2 (adopting without comment Section III.B–D of Requester's Comments to Response After ACP).

Requester improperly carves out the purported control power circuitry of Miller '011, and argues that the fundamental differences between UPS systems and welding power supplies are not relevant because Miller '011 is cited only for its disclosure of the control power circuitry. Comments to Response After ACP at 12. According to Requester, Miller '011 is analogous so long as the control power circuitry, considered in a vacuum, is "compatible" with the welding power supplies of the Primary References. *Id.* This misses the point entirely. Effectively, Requester argues that Miller '011 is analogous if one of ordinary skill were to ignore everything that makes it non-analogous.

In determining whether Miller '011 is analogous art, the relevant issue is not whether Miller discloses features that Requester believes to be useful in a welding power supply (based on hindsight). Rather, the relevant issue is whether a person of ordinary skill, after considering the design differences between UPS systems and welding power supplies, would even look to UPS art in the first place to design a welding power supply. Under the proper analysis, the Examiner must similarly consider these design

4 The pending claims require an "output voltage [that is] independent of the input magnitude voltage" (claim 1 as amended).

differences in determining whether Miller '011 is analogous art. *See Nowlin*, 2009 WL 705997, at *5–6; *see also KSR*, 550 U.S. at 417. Because neither the Examiner nor Requester has provided any reason why a person of ordinary skill would have looked to UPS art in the first place, the Board should find that Miller '011 is non-analogous.

(C) The Examiner Failed to Consider That Chambers '024 and Miller '011 Are Non-Analogous, Because They Relate to Low-Power, Non-Welding Art.

Chambers '024 and Miller '011 are not within the proper scope of the prior art, because the control circuits of these references are designed for low-power environments—not a high-power environment such as a welding power supply.[5]

Earlier statements by Requester (and its engineers), as a large developer of industrial welding products, help establish that the proper scope of analogous art, from the perspective of one of ordinary skill in the art, excludes low-power references. For example, Requester explained in its '132 patent (filed September 5, 2000) that low-power, non-welding power supplies existed well before the invention of Owner's '242 patent, but that those architectures could "not be used for welding [applications]." U.S. Patent No. 6,504,132, assigned to Lincoln Global, Inc. ("Requester's '132 patent"), at 1:30–38. Requester further described the failed attempts by those of ordinary skill to convert low-power art:

> In the mid 1990's, a few of the companies in the electric arc welding field started experimenting with modifying [low-power] power supplies to create a high capacity power supply for welding and plasma cutting. **Then, it was realized that merely converting existing power supplies to welding power supplies was not the proper development direction.** Thus, The Lincoln Electric Company of Cleveland, Ohio took a different tack. Power supplies were tailored for welding. **At first such efforts involved only an attempt to use low power units for high power welding. This was not commercially successful.**

Id. at 3:15–25 (emphasis added).

These efforts failed because the unique demands of welding power supplies present several problems. Lipo Decl. at ¶ 41. First, low-power systems were typically designed for a single input

5 The Examiner also erroneously relies on the Jones, McGuire, Noworolski, Vanderhelst, Shekhawat, Smith, Streit, and Martinez references, which similarly relate to low-power, non-welding art. *See* RAN at ¶¶ 8–12, 15–20, 23–29, 33–38, 41–47, 50–53, 57–61, 65–71, 75–79, 83–89, 93–98, 102–08, 112–29; Response to First Action at 27.

voltage. As such, these power sources cannot provide a consistent output across different input voltages, and components in these power supplies that operate safely at a particular input level can be damaged when operating at an alternative input level. *Id.*

Second, low-power systems were typically designed for relatively steady loads. Lipo Decl. at ¶ 42; Requester's U.S. Patent App. 11/551,957, at ¶ 6. Welding, on the other hand, is a very dynamic process. Lipo Decl. at ¶ 42. Numerous variables affect output current and load, including arc length, electrode type, shield type, air currents, dirt on the work piece, puddle size, weld orientation, operator technique, and lastly the type of welding process determined to be most suitable for the application. *Id.* These variables constantly change, and lead to a constantly changing output current and voltage. *Id.* Moreover, the changes in output are unpredictable in both magnitude and direction. *Id.* Thus, when the welding community refers to constant voltage, it is something much more complex than a regulated voltage. *Id.* It is actually a voltage-current curve that is optimized for welding processes. *Id.*

Third, "scaling up" low-power power supply technology to meet the demands of welding power supplies presents many problems, such as switching losses, line losses, heat damage, inductive losses, and the creation of electromagnetic interference ("EMI"). Lipo Decl. at ¶ 43. Switching losses occur as a switch turns on and off, and, as the power through the switch is increased, the losses increase in even greater proportion. *Id.* Greater power also increases line losses and core losses (in magnetic components such as transformers and inductors), resulting in lower efficiency. *Id.* at ¶ 44. In turn, larger losses create greater heat, making heat dissipation a greater challenge at high power.[6] *Id.* at ¶45. Additionally, EMI increases with power. *Id.* at ¶ 46. A low-power circuit is likely to produce EMI well within acceptable limits, but a high-power circuit using the same topology will likely run afoul of regulatory standards, and could also cause nearby digital circuitry (such as a welding power supply controller) to malfunction. *Id.*

In contrast, the circuits of Chambers '024 and Miller '011 do not need to address the concerns of high-power welding power supplies, because they contemplate low-power applications that can be

6 For example, a 10 percent loss at 50W creates a 5W loss which is relatively easy to dissipate, while a 10 percent loss at 10,000W creates a 1,000W loss, which is much more difficult to dissipate, and can result in damage to components. Lipo Decl. at ¶ 44.

accommodated by a battery-backed power supply such as a UPS. Chambers '024 at 1:24–27; Miller '011 at 1:5–12. Indeed, Miller '011 teaches a UPS design with a 15A fuse and a 10A SG150 thermistor (FIG. 5a).[7] Thus, when operating at an input/output of 115V, the Miller UPS can accommodate, at most, 1.15 KVA (or 1.15 KW assuming a power factor of unity). This is far below the level required for industrial, welding-type applications. *See* Requester's '132 Patent at 3:5–7 ("These small power supplies normally created less than 2000 watts of power and were not usable for industrial applications.").

The Examiner erred by failing to address any of these considerations that not only are unique to the welding art but also demonstrate that those of ordinary skill would not have turned to low-power references such as Chambers '024 and Miller '011 to improve welding power supplies. *See Nowlin*, 2009 WL 705997, at *5–6; *see also KSR,* 550 U.S. at 417. Moreover, the Examiner's unreasoned and wholesale adoption of Requester's arguments does not remedy this error. *See* RAN at ¶ 130.2 (adopting without comment Section III.B–D of Requester's Comments to Response After ACP).

Requester improperly carves out the low-power control circuitry of the claimed invention, and argues that high-power design considerations are not relevant to this control circuitry. *See* Comments to Response After ACP at 14–17. Again, Requester's reasoning appears to be that Chambers '024 and Miller '011 would be analogous if one of ordinary skill were to ignore all of the design considerations that make these references non-analogous. The control power circuitry of the claimed invention and of Chambers and Miller, however, must be considered in context with the environments in which they operate, and not in a vacuum. *See Nowlin*, 2009 WL 705997, at *5–6.

Moreover, contrary to Requester's arguments, high-power design considerations are relevant even to the low-power control circuitry of welding power supplies. The Geissler invention derives control power *from* the high-power mains. Thus, even though the control circuitry of the claimed invention is not high-power, the environment in which the control circuitry operates is high-power. As a result of this high-power environment, the low-power control circuitry must nevertheless face switching

7 A thermistor is a circuit component that is used to limit current, because the resistance of a thermistor depends on the current through it (or more specifically its temperature). The Miller '011 UPS uses an SG150 thermistor that can accommodate a maximum steady-state current of 10A.

losses, heat damage, inductive losses, and EMI. *See* Lipo Decl. at ¶ 43. For example, the switching losses of a low-power transistor that switches a high-voltage bus will typically increase as the bus voltage increases. *See id.* In addition, low-power control circuitry may not produce significant EMI, but the control circuitry must still be designed with the EMI of the entire welding power circuit in mind. *See id.* at ¶ 46. Also, welders are typically designed for use in outdoor, damp, dirty environments, and those of ordinary skill would have recognized that these environments present special design considerations not present in low-power environments.

Furthermore, Requester's reliance on the Federal Circuit's *Icon* decision is not only misplaced but also inconsistent with its earlier, non-litigation-inspired statements. *See* Comments to Response After ACP at 13 (discussing *In re Icon Health & Fitness*, 496 F.3d 1374 (Fed. Cir. 2007)). In *Icon*, the Federal Circuit found that prior art relating to a folding bed was reasonably pertinent to a folding-treadmill invention, because "nothing about Icon's folding mechanism require[d] any particular focus on treadmills." *Icon*, 496 F.3d at 1380. Significantly, the record in *Icon* did not indicate that those in the treadmill art previously attempted and failed to incorporate features from folding beds. Nor did the record in *Icon* indicate that those of ordinary skill rejected the folding-bed art as inapplicable to treadmills. As discussed above, the same cannot be said here. Tellingly, Requester's own statements, for example in its '132 patent, explain how those of ordinary skill rejected low-power art as inapplicable after failing to incorporate features of low-power power supplies into welding power supplies. Therefore, the Board should find that Chambers '024 and Miller '011 relate to non-analogous, low-power art, and reverse the Examiner's § 103 rejections of claims 1–59.

ii. The Examiner Miscast the Claimed Invention as Merely Providing Control Power, and Failed to Articulate Any "Apparent Reason" to Combine Chambers '024 or Miller '011 with the Primary References.

Geissler invented and claimed a welding power supply. Without considering "the subject matter as a whole," 35 U.S.C. § 103(a), however, the Examiner has improperly reduced the Geissler invention to one of providing control power. Significantly, even if Chambers '024 and Miller '011 can be considered

as analogous art, which is a separate inquiry, the Examiner has nevertheless failed to provide any meaningful reason to combine these references with Primary References to make a *prima facie* case obviousness. Indeed, both the Examiner and Requester generally assume that analogous art, without more, is obvious to combine. RAN at ¶ 7, Page 9; Comments to Response After ACP at 16–17. Not only did the Examiner and Requester misapply the law but they also improperly shifted the burden onto Owner to show a lack of motivation to combine the references.

In *KSR,* the Supreme Court recognized that "inventions in most, if not all, instances rely upon building blocks long since uncovered, and [that] claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *KSR*, 550 U.S. at 418. Although the Court cautioned against a rigid test that requires the prior art to provide an express teaching, suggestion, or motivation to combine references, *id.* at 419, the Court did not alter the statutory mandate that claimed invention be considered "as a whole." 35 U.S.C. § 103(a). Indeed, the Court explained that it is often necessary to identify an "apparent reason" to combine the elements as claimed in the patent at issue. *KSR,* 550 U.S. at 418. This apparent reason to combine "should be made explicit." *Id.*

Applying *KSR*'s principles, the Federal Circuit has similarly explained that "[w]e must still be careful not to allow hindsight reconstruction of references to reach the claimed invention without *any* explanation as to how or why the references would be combined to produce the claimed invention." *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2007) (emphasis in original); *see also* MPEP § 2143.01(III) ("The mere fact that references *can* be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill.").

Here, based on their conclusion that Chambers '024 and Miller '011 are "reasonably pertinent," the Examiner and Requester summarily conclude that it must necessarily follow that those skilled in the art would have combined the teachings of the Primary References with either Chambers or Miller to achieve the claimed invention. RAN at ¶ 7, Page 9; Comments to Response After ACP at 16–17. This is not the articulated reasoning that *KSR* contemplates, especially when many of the cited Primary

References contain no mention of control power whatsoever. *See KSR,* 550 U.S. at 418; Section 7.b.i below. Therefore, the Board should dismiss this flawed obviousness analysis and reverse the Examiner's rejection of claims 1–59.

iii. Chambers '024 Does Not Teach the Claimed Control Power Circuit, and Teaches Away from Any Combination with Primary References.

All of the claims require in some form "a control power circuit configured to receive the dc second signal and provide a controller power signal to the controller power input" (claim 1 as amended). Significantly, the "dc second signal" of the Geissler invention is a regulated, dc signal or dc bus—it is ***not*** an unregulated, rectified input. *See* Section 5.a above. Chambers '024 fails to teach any control power circuitry that is "configured to receive the dc second signal," because the disclosed preregulator circuit derives control power from the unregulated, rectified input. Chambers '024 at 6:65–67 and FIG. 3. Chambers also teaches away from the claimed control power circuitry due to the limitations of its down chopper design.

The entire control power circuit of Chambers '024 (FIG. 1) is contained within preregulator power supply 10. As shown in FIG. 3 (annotated below) and described at 6:65–67, preregulator power supply 10 is connected (via 14) to receive the unregulated, rectified utility power from input rectifier 101.

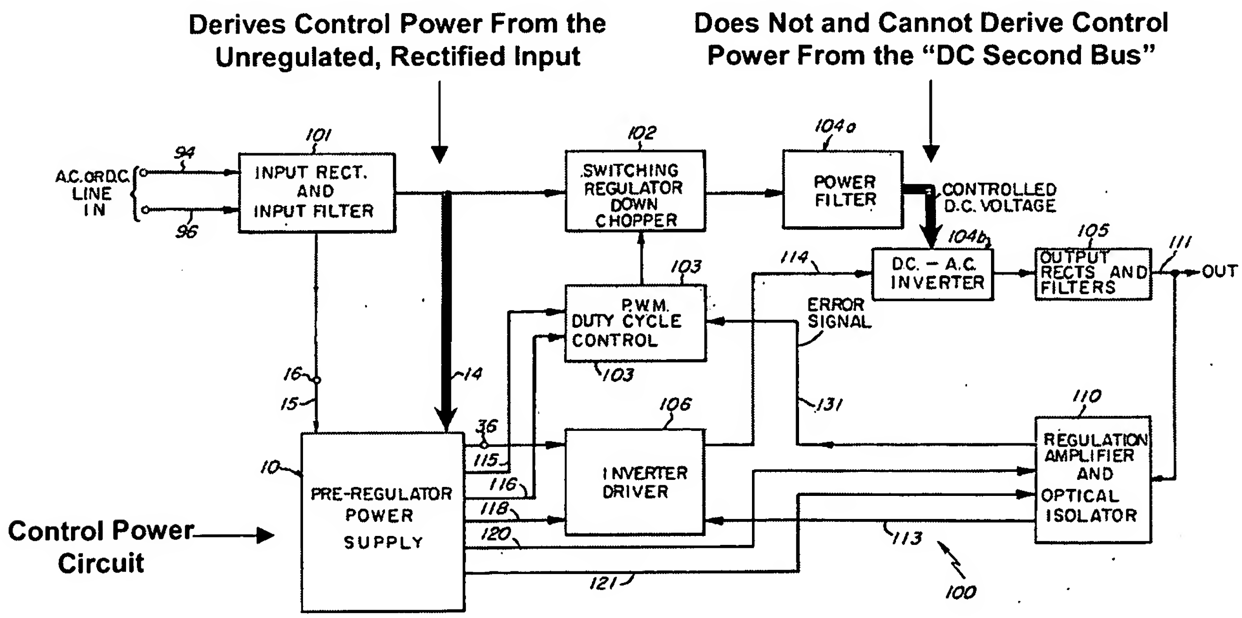


FIG. 3 of Chambers '024 (Annotated)

Thus, Chambers '024 teaches to derive control power (at start-up and after start-up) from the unregulated, rectified input—***not*** the regulated "dc second signal" supplied by the down chopper circuit (elements 102 and 104a). The distinction is not merely semantic, because Chambers '024 did not face the "chicken or egg" problem that Geissler faced and solved in determining how to draw power from a dc bus before it reaches its boosted value. *See* Section 5.b.ii above; '242 Patent at 6:6–12

The Examiner concedes that Chambers '024 does not disclose a control power circuit connected to a "dc second signal," but nevertheless summarily concludes that Chambers '024 teaches to provide control power in an "identical manner as the '242 patent." RAN at ¶ 7, Pages 8–9. Moreover, the Examiner's unreasoned and wholesale adoption of Requester's arguments fails to provide proper justification. *See* RAN at ¶ 130.1 (adopting without comment Section III.A of Requester's Comments to Response After ACP).

Requester merely notes that the power supply of Chambers '024 can be connected to "an alternating current or direct current source," and then concludes without support that "preregulator power supply 10 can accept power from a regulated dc source if desired." Comments to Response After ACP at 3–4. Chambers, however, explicitly contemplates an "*unregulated or rectified ac input power source.*" Chambers '024 at 1:30–34 (emphasis added). Even assuming that Chambers could derive control power from a regulated dc source, Requester makes no attempt to argue this source can be the claimed "dc second signal."

Indeed, Requester concedes that the control power circuit of Chambers ***cannot*** be "configured to receive the dc second signal" supplied by the down chopper circuit. Comments to Response After ACP at 4. If the control power circuit of Chambers were "configured to receive the dc second signal," the down chopper circuit would not be able to provide an output until it receives control power from preregulator power supply 10, which in turn would not be able to provide control power until it receives an output from the down chopper circuit. *See id.* As a result, Chambers does not and cannot address the "chicken

or egg" problem that the Geissler invention solved. Therefore, Chambers does not teach and, in fact, teaches away from the claimed control power circuit.

Recognizing that Chambers '024 fails to teach "a control power circuit configured to receive the dc second signal," Requester instead argues that preregulator power supply 10 of Chambers '024 should be carved out and modified so that it is connected to the output of the boost circuits described in the Primary References. *See* Comments to Response After ACP at 4. Not surprisingly, Requester fails to articulate any "apparent reason" (other than hindsight) as to why a person of ordinary skill in the art of designing welding power supplies would have made such a modification and combination, especially in the face of the "chicken or egg" problem that Geissler addressed. *See KSR*, 550 U.S. at 418; *Innogenetics,* 512 F.3d at 1374. Therefore, the Board should reject the Examiner's rejections that rely on Chambers '024.

iv. Miller '011 Teaches Away from Any Combination with the Primary References.

Miller '011 teaches away from the claimed invention, because the design of its control power circuit would impose unnecessarily high voltages and stresses on the switching components at high bus voltages. Moreover, the Miller design is intended for a power supply that accepts only discrete inputs, not a range of inputs.

First, the UPS system of Miller '011 generates control power using a flyback topology with transistor Q30, *see* Miller '011 at 16:15–26 and FIG. 14a, which presents an increased risk of failure at higher bus voltages. Based on the design of the Miller circuit, transistor Q30 must be able to withstand not only the dc bus voltage but also a reflected output voltage of at least 100V.[8] Given that the Miller UPS uses a 400V bus, transistor Q30 blocks up to 500V or more. As the voltage that transistor Q30 blocks is increased, so does the cost and the risk of failure. Thus, when designing a welding power supply that accepts a range of input voltages and boosts those input voltages, one of ordinary skill would

8 When switch Q30 is off, the voltage on the secondary of transformer T13 is reflected back to the primary, which adds to the bus voltage applied across the switch. The 100V zener diode VR5 limits the reflected output to 100V plus the voltage drop across R145, but this added voltage must be considered in designing a control power circuit based on the design of Miller '011.

have naturally turned away from a design that adds at least 100V to an already high dc bus voltage that is applied across the switching transistor, particularly if it will result in increased cost and/or risk of failure.

Second, the UPS system of Miller '011 is designed to accept and provide control power at only discrete inputs, *e.g.*, 115V or 230V. Thus, a person of ordinary skill designing a welding power supply that accepts a ***range*** of input voltages would be discouraged from importing the control power circuitry of Miller '011.[9] Therefore, the Board should find that Miller '011 teaches away from the claimed invention, and reverse the Examiner's obviousness rejections that rely on Miller.

b. The Board Should Reverse the Examiner's § 103(a) Rejections of Claims 3–9, 12–18, 21–27, 35–41, 44–50, and 53–59, Because the Cited References Do Not Teach the Claimed Control Power Circuitry and Second DC Bus.

In rejecting claims 3–9, 12–18, 21–27, 35–41, 44–50, and 53–59, the Examiner failed to consider that these claims recite a unique combination of control power circuitry and a second dc bus that is not encompassed or rendered obvious by the prior art. As explained below, each of the cited Primary References (*i.e.,* JP '465, JP '302, Moriguchi '381, EP '088, GB '958, DE '906, Moriguchi '110, Jones '986, Borowy '868, and Thommes '741) either (i) does not disclose any form of control power circuitry, (ii) does not teach to provide a second dc bus with a magnitude that is both greater than and independent of the rectified magnitude, or (iii) would be inoperable if combined with the Control Power References. Therefore, the Board should reverse the Examiner's rejection of these claims.

i. Most of the Primary References Do Not Disclose Any Form of Control Power Circuitry.

All of the claims of the '242 patent require a specific type of control power that includes start-up circuitry for providing control power at start-up, as well as after start-up circuitry for providing control power after start-up. As explained in Sections 5.b.ii and 7.d.i, this aspect of the invention fulfilled a significant need in the industry for a welder capable of providing reliable control power over a range of input voltages. The Examiner, however, erroneously relies on several Primary References including EP

9 The pending claims require an "output voltage [that is] independent of the input magnitude voltage" (claim 1 as amended).

'088, GB '958, DE '906, Moriguchi '110, and Jones '986,[10] that not only do not disclose this type of control power, but, in fact, do not disclose *any* method of providing control power whatsoever. Moreover, the Examiner's wholesale adoption of Requester's comments does not remedy this error.

Even accepting, *arguendo*, Requester's conclusory statement that one of ordinary skill in the art would have been motivated to use a converter that creates controller power without having to accommodate a range of ac input voltages and frequencies, the claims of the '242 patent are not obvious. At the time of the invention of the '242 patent, there were several known, available methods of generating control power, *e.g.,* using a dedicated single value ac input; using a different control power source for each of the multiple inputs; providing control power at only one input power; running off the welder output or wire feeder voltage, which is generally 20V to 100V; or running off combinations of primary and output voltages. In fact, Owner's patents, *e.g.*, U.S. Patent Nos. 5,601,741 and 5,319,533, teach alternative methods of providing control power. None of these options—and there are likely other options—would teach the claimed invention. Because neither the Examiner nor Requester has articulated any reason why one of ordinary skill in the art would have been motivated to adopt the unique solution claimed in Owner's '242 patent, these rejections must be reversed.

ii. The Primary References That Purportedly Disclose Some Form of Control Power Circuitry Do Not Disclose the Claimed Second DC Bus.

Claims 3–9, 12–18, 21–27, 35–41, 44–50, and 53–59 require in some form a "dc second signal" or second dc bus with a magnitude that is both (1) greater than the rectified magnitude of the highest input voltage in the range of input voltages, and (2) independent of the rectified input. The Examiner, however, failed to consider that the JP '465, Moriguchi '381, Borowy '868, and JP '302 references do not teach the claimed second dc bus.

10 Jones is also not analogous art, because it relates to a low-power, non-welding power supply having a 200-watt power rating. *See* Jones '986 at 4:25–31; Section 7.a.i.(C).

(A) JP '465 Does Not Disclose a Second DC Bus with a Magnitude Greater than the Rectified Magnitude of the Highest Input Voltage.

JP '465 discloses a bus magnitude that is *equal* to (not *greater* than) the rectified magnitude. Specifically, JP '465 discloses an arc power unit that accepts inputs of 100V and 200V ac, and teaches to replace the prior-art circuit of Figure 2 with the improved boost circuit of Figure 1. But JP '465 does not discuss the dc bus magnitude of the improved circuit, and notes only that the dc bus magnitude of the prior-art circuit is ($100\,\mathrm{V} \times \sqrt{2} \times 2 \approx$) 290V for both inputs. JP '465 at 374, 8th full para; 375, 3d para. And JP '465 is explicit that this bus magnitude (rounded off slightly) is an approximation of the rectified magnitude of the 200V input. *Id.*

One of ordinary skill would expect the dc bus magnitude to remain at 290V even in the improved circuit, because a higher bus would require different inverter components. Significantly, JP '465 uses the *same* inverter components—transistors 13 and 14—for both circuits, and cautions that the voltage into the inverter must be fixed within a certain range or tolerance so that it does not destroy these transistors. *Id.* at 377, 4th full para, Figures 1 and 2. Therefore, JP '465 does not disclose the claimed dc bus magnitude, and at best, teaches to provide a dc bus having a magnitude *equal* to the rectified magnitude of the greater input voltage.

(B) Moriguchi '381 Does Not Disclose a Second DC Bus with a Magnitude Greater than the Rectified Magnitude of the Highest Input Voltage.

Moriguchi '381 similarly discloses a bus magnitude that is *equal* to (not *greater* than) the rectified magnitude. Specifically, Moriguchi '381 teaches a welding power supply that accepts an ac input and includes a boost converter. Moriguchi '381 at 1:21–23, FIG 1. Although Moriguchi does not explicitly disclose the range of possible inputs, it does disclose that the output of the boost converter should be limited to the rectified magnitude of the highest possible input:

> The converter control unit 12 controls the duration of the control signal for the IGBT 10 in such a manner that the voltage-representative signal can have a value corresponding to a predetermined voltage, *e.g.*, a voltage resulting from rectifying the highest one of possible three-phase AC voltages which may be applied to the input terminals 2a–2c and that the current-representative signal can be not greater than a value corresponding to a predetermined current.

Id. at 3:27–39. Thus, Moriguchi '381 does not disclose a bus magnitude that is *greater* than the rectified magnitude of highest input voltage as the claims require.

(C) Borowy '868 Does Not Disclose a Second DC Bus with a Magnitude Greater than the Rectified Magnitude of the Highest Input Voltage.

Borowy '868 discloses a bus magnitude that is *less* than (not *greater* than) the rectified magnitude. Specifically, Borowy teaches a plasma arc power supply that includes a boost converter and contemplates utility power inputs of 200V, 230V, 380V, 460V, 500V, and 575V. Borowy '868 at 1:17–19. Borowy, however, discloses a 750V dc bus and describes this bus voltage as an "upper limit" to the output of the boost converter. *Id.* at 7:22–25. Because 750V is well below the rectified magnitude of highest input of 575V, Borowy does not disclose a bus magnitude that is *greater* than the rectified magnitude of highest input voltage as the claims require.[11]

(D) JP '302 Does Not Disclose a Second DC Bus with a Magnitude Independent of the Rectified Input.

JP '302 discloses a dc bus with a magnitude that is *dependent* on (not *independent* of) the rectified input. Specifically, JP '302 teaches a welding power supply that includes a bus converter and is configured to accept several input voltages: 200V, 208V, 230V, 240V, 380V, 415V, 460V, and 575V. JP '302 at ¶¶ 5, 19. Significantly, JP '302 classifies the voltages of 200V, 208V, 230V, and 240V as "low voltage," and the voltages of 380V, 415V, 460V, and 575V as "high voltage." *Id.* at ¶ 19. For the "low voltage" inputs, the JP '302 system creates a bus voltage of approximately 340V. *Id.* at ¶ 24. But for the "high voltage" inputs, the JP '302 system creates a bus voltage of 813V. *Id.* at ¶ 25. Accordingly, the dc bus magnitude is *dependent* on the input voltage, and hence the rectified input, and is not *independent* of the rectified input as the claims require. *See id.* at ¶ 36. JP '302 further explicitly explains that the purpose of this design is to avoid boosting a 200V input to the higher bus voltage, so as to lessen the load on the boost converter. *Id.* at ¶ 26. Therefore, JP '302 does not disclose the claimed *independent* dc bus magnitude, but rather teaches to provide a dc bus having a magnitude *dependent* on the rectified input.

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11 Borowy is also not prior art as explained in Section 7.c below.

iii. Thommes '741 Would Be Inoperable If Combined with the Control Power References.

Owner's Thommes '741 patent discloses a multi-input welding power supply that includes a boost converter with an output of "approximately 800 volts." '741 Patent at 4:8–21, FIG. 1. The Thommes power supply would be inoperable, however, if combined with the control power circuits of Chambers '024 or Miller '011.

First, the high bus voltage of the Thommes welding power supply is incompatible with the control-power design of Chambers '024. Significantly, the pulse-width-modulating (PWM) circuits of welding power supplies at the time of the Geissler invention typically had a propagation delay of about 0.2 to 0.5 microseconds, which corresponds to the delay of the PWM switch turning on and the delay of the logic/control circuitry. Exhibit D, Madsen Decl. at ¶ 6. As the time that the PWM switch stays on (*i.e.*, the pulse width) approaches the propagation delay of the control circuit, PWM control becomes more difficult and can lead to instability in the control loops. Given that the Thommes power supply uses an 18V control power signal and an approximately 800V bus, its PWM switch is on about 2% of the time (*i.e.*, 18V/800V is approximately 2%). '741 Patent at 4:8–21, 4:45–52. But the control power circuit of Chambers is designed to operate at a frequency of 40 kHz or a period of 25 microseconds. Chambers '024 at 4:45–47. Accordingly, the pulse width of a combined system would be about 0.5 microseconds (*i.e.*, 2% of 25 microseconds), which is dangerously close to propagation delay of the Thommes control circuit. Therefore, one of ordinary skill would not have combined Thommes and Chambers, because it would result in a pulse width on the order of the propagation delay. *See* Madsen Decl. at ¶ 6.

Second, the high bus voltage of the Thommes welding power supply is also incompatible with the control-power design of Miller '011. As explained above in Section 7.a.iv, the Miller UPS system generates control power using transistor Q30 in a flyback topology, and the circuit design adds at least 100V to the dc bus voltage that transistor Q30 must be able to withstand. Given the approximately 800V dc bus of the Thommes power supply, transistor Q30 would have to block upwards of 900V. This would

result in increased cost and potential failure. Therefore, one of ordinary skill would not have combined Thommes and Miller.

In short, the Board should reverse the Examiner's rejections of claims 3–9, 12–18, 21–27, 35–41, 44–50, and 53–59, because the cited references do not teach the claimed control power circuitry and second dc bus.

c. The Board Should Reverse the Examiner's § 103(a) Rejections of Claims 1–59 That Rely on Borowy '868, Because Borowy Is Not Prior Art.

Owner has submitted a declaration by Steven J. Geissler under 37 C.F.R. § 1.131, which establishes that the claimed invention was made "at least by the date of February 23, 2000." Exhibit E, Geissler Decl. at ¶ 4. Accordingly, the Borowy '868 reference, which has a priority date of February 29, 2000, is not prior art.

The Examiner, however, improperly refuses to consider the Geissler Declaration, arguing that the declaration does not address all of the elements of the newly amended claims, including the start-up and after start-up circuitry. RAN at ¶ 130.4, Page 75. This is incorrect. For example, the last drawing submitted with the Geissler Declaration is identical to FIG. 4 of the '242 patent, which depicts an embodiment of the claimed start-up and after start-up circuitry. The drawings also contain notes that explain that control power is provided at start-up by "bleeding thru R4, R5." The drawings further explain that switch "Q1 turns on" after start-up "when buck +15 reaches ~ 11.7," and that "this enable[s] [the] logic" circuitry. These details of the start-up and after start-up circuitry are described nearly verbatim in the '242 specification at 8:31–56. Thus, the Geissler Declaration establishes that Borowy '868 is not prior art, and the Board should reverse the Examiner's obviousness rejections that rely on Borowy (RAN at ¶¶ 54–61).[12]

12 Requester independently argues that the Geissler Declaration, as submitted in this reexamination, does not indicate the date of the drawings. Comments to Response After ACP at 20–21. The declaration was originally submitted in support of Owner's U.S. Patent App. No. 09/969,535. As originally submitted, the declaration included a printout that corroborated the date of the accompanying drawings. In resubmitting the declaration in this reexamination, however, Owner mistakenly omitted the printout. This printout is now attached separately as Exhibit F, and is the subject of an accompanying petition.

d. The Board Should Reverse the Examiner's § 103(a) Rejections of Claims 1–59, Because the Examiner Failed to Address Owner's Substantial Evidence of Secondary Considerations.

The Supreme Court has explained that secondary considerations such as commercial success, long-felt but unsolved needs, failure of others, copying, and successful licensing, can shed light on the circumstances surrounding the origin of the claimed invention. *Graham*, 383 U.S. at 17; *see also* MPEP § 2141. Such objective indicia of nonobviousness may be used to rebut a *prima facie* showing of obviousness. *In re Sullivan,* 498 F.3d 1345, 1351 (2007); *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999). When presented with evidence of secondary considerations, an examiner must meaningfully consider, acknowledge, and comment upon that evidence, including all entered affidavits and declarations, and may ***not*** dismiss it with merely conclusory statements:

> Where the evidence is insufficient to overcome the rejection, the examiner must specifically explain why the evidence is insufficient. General statements such as "the declaration lacks technical validity" or the "the evidence is not commensurate with the scope of the claims" without an explanation supporting such findings are insufficient.

MPEP § 716.01; *see also Sullivan*, 498 F.3d at 1351–53 (explaining that the PTO must consider all rebuttal evidence, including evidence of secondary considerations).

In this reexamination, Owner previously submitted declarations by David Stanzel and Michael Madsen (Exhibits B and D) and detailed the numerous secondary considerations that demonstrate that the claimed invention is nonobvious. *See generally* Response to First Action at 20–24; Response After ACP at 12. The Examiner, however, summarily concluded that Owner's evidence "fails to rebut the any of the obviousness rationales set forth by the examiner in the adopted rejections." RAN at ¶ 130.3. Rather than provide specific explanations for rejecting Owner's evidence, the Examiner provided only conclusory statements that Owner's evidence "fails to establish a nexus" and is inadequate "given the strength of the *prima facie* obviousness showing." *Id.* Moreover, the Examiner adopted Requester's arguments wholesale and without any explanation as to which arguments she found persuasive, or why.

Requester, however, improperly proposes a series of unsupported, hypothetical reasons as to why Owner's evidence of secondary considerations might be insufficient, and argues that it is Owner's burden

to prove otherwise. *See* Comments to Response After ACP at 19. As explained more fully below, the '242 patented technology has satisfied a long-felt need, experienced unquestionable commercial success, and has been subject to licenses.

i. The '242 Patent Fulfilled the Long-Felt But Unsolved Need For Reliable, Efficient Control Power For Inverter-Type Power Welding Supplies Over a Range of Voltage Inputs.

Before the development of Owner's technology, there existed a long-felt need for a lightweight, inverter-type, welding power supply capable of automatically and reliably utilizing a wide range of voltage inputs. *See* Section 5.a.i above. Such welding power supplies, in turn, needed the ability to reliably and efficiently provide control power over the same range of input voltages. *Id.* Although this need was recognized in the field, especially after the advent of Owner's patented technology that allowed for the seamless use of multiple input voltages (*e.g.*, U.S. Patent Nos. 5,601,741, 6,002,103, 6,239,407, 6,849,827, 7,049,546), the need went unfulfilled.

Owner's products that embody the '242 patent met that need by utilizing a first and second set of circuitry for supplying control power. This control power circuitry is more reliable than the prior-art solutions, because it does not rely on mechanical contacts that can be jostled or otherwise cannot keep pace with changes in the input. *See* Section 5.b.ii.(A) above. One recent example bears this out.

In early 2007, Owner learned that some of its welding power supplies were being used by a customer that had experienced operational issues at the jobsite. Stanzel Decl. at ¶ 9. Although manufactured by Owner, the product in question relied on a mechanical linking technology, and did not use Owner's Auto-Line™ technology that incorporates the claimed features of the '242 patent. *Id.* Specifically, the customer had experienced power failure at the jobsite. *Id.* When power was restored, it did not immediately return to the nominal line voltage of 460V, and was set to a lower level for a short time. *Id.* Despite having built-in circuit delays to prevent improper linkage, the customer's units linked to the 230V relay after the delay time was exceeded. *Id.* And when power returned to the nominal voltage of 460V, some of the units naturally failed. *Id.* The issue was resolved, albeit at significant delay

and expense, when Owner delivered repair parts the next morning, but all those involved, including the customer, concluded that Auto-Line™ would likely have prevented these failures from occurring in the first place. *Id.* Owner has since released a new version of the product in question with the Auto-Line™ feature. *Id.* at ¶ 8. This is but one example of how the claimed invention of the '242 patent addressed a significant need for a control power solution without mechanical relays.

The marketing of Owner's welding and cutting products also emphasized that Owner's solution met the need for a non-mechanical solution, as in the excerpt below from Owner's Auto-Line™ brochure:

> Only Miller inverters feature Auto-Line. And make no mistake: Auto-Line™ significantly raises the performance bar over the older technology of automatic linking. With automatic linking, the power source senses the incoming voltage and automatically configures or "links" the power switching transistors for 230 or 460V primary. While a step up from removing the machine cover and manually linking jumpers, it still involves mechanical components that are subject to failure. And it can't compensate for voltage spikes or dips beyond +/- 10% of nominal.

See Exhibit C, Auto-Line™ Brochure at 2. Owner, thus, emphasized and educated its customers that its Auto-Line™ solution was a significant improvement over prior-art solutions that involved "mechanical components that are subject to failure." Customers naturally chose Owner's Auto-Line™ products, because these products satisfied the need for a portable welding and cutting power source capable of handling various voltage inputs without the use of mechanical linkages. Therefore, the Board should consider Owner's evidence that its products fulfilled a long-felt need, and reverse the Examiner's obviousness rejections.

ii. Products Embodying the Claims of the '242 Patent Have Been a Commercial Success.

Commercial success that is tied to the claimed invention may be used to show that the invention was nonobvious. *WMS,* 184 F.3d at 1359–60. Because the '242 patent satisfied a long-felt need, it is not surprising that products embodying the claimed invention have enjoyed significant commercial success.

Owner's Auto-Line™ products incorporate the claimed invention of the '242 patent. For example, Owner's Maxstar® 150 product is built, marketed, and sold as a welding power supply that includes the Auto-Line™ technology. After the First Office Action, Owner's submitted a declaration by

David Stanzel, who examined the Maxstar® 150 (and other Auto-Line™ products) and confirmed that it embodies the claimed features of the '242 patent. Stanzel Decl. at ¶ 17. As further support, Owner submitted a declaration by Michael Madsen, who similarly examined the Maxstar® 150 and supplied claim charts demonstrating that Maxstar® 150 includes each of the claimed elements (as amended during reexamination). *See* Exhibit D, Madsen Decl., claim chart at 10–16.

The commercial success of the Auto-Line™ feature is evidenced by the immediate impact it had in the marketplace. In particular, customers quickly noted that the lack of mechanical relays made welders and cutters with Auto-Line™ much more reliable over a range of voltages than those without Auto-Line™. Since its introduction, the Auto-Line™ feature has been rapidly expanded and included with the full range of Owner's welding and cutting products. Stanzel Decl. at ¶ 8. During this time frame, sales of Auto-Line™ products rose dramatically. *Id.* Owner acknowledges that while other factors may have played a role in the increased sales, the information garnered from product managers indicates that the Auto-Line™ feature is a dominant, if not *the* dominant, aspect of those products contributing to their commercial success. *Id.* Indeed, as explained above, Owner's marketing efforts focused on the benefits of the Auto-Line™ feature, which incorporates the '242 invention.

That the patented invention was responsible for the commercial success is further supported by the fact that Owner's Maxstar® series includes both products that incorporate the '242 invention and products that do not. As shown in the graph in Section 5.b.ii.(C) above, products incorporating the '242 invention (*e.g.*, the Maxstar® 150) enjoyed unquestionable commercial success over products that did not (*e.g.*, the Maxstar® 140). The commercial success of products embodying the claimed invention, therefore, demonstrates that the invention was nonobvious.

As explained above, the Examiner never meaningfully addressed Owner's evidence of commercial success, and adopted Requester's arguments without comment or explanation. Requester, however, improperly argues that Owner's evidence that the Auto-Line™ products embody the claimed invention is conclusory, relying on this Board's decision in *Standish*. *See* Comments to Response After

ACP at 19 (citing *Ex Parte Standish*, 10 U.S.P.Q. 1454 (Bd. Pat. App. & Int'f 1989)). In *Standish*, the patent applicant's evidence of commercial success was limited to the gross sales of a single product and an unsupported conclusion that the product "was constructed according to the disclosure and the claims of [the] patent application." 10 U.S.P.Q. at 1458. *Standish* is inapposite. Here, Owner's declarant, Michael Madsen conducted a thorough examination of the Maxstar® 150 product, and submitted under penalty of perjury, detailed claim charts confirming the presence of each element of the pending claims. Moreover, Owner has submitted more than just gross sales figures, as was the case in *Standish*, but also a comparison of the success of two products, one that embodies the claimed invention (Maxstar® 150) and one that does not (Maxstar® 140). This is well within what *Standish* contemplates.[13]

Requester also improperly argues that Owner's evidence of commercial success is insufficient by presenting a series of unsupported hypothetical circumstances. *See* Comments to Response After ACP at 19. For example, Requester speculates that the commercial success of the Maxstar® 150 could be due to Owner's marketing efforts, an unclaimed feature, or a feature known in the prior art. *Id.* But Requester presents no basis for suggesting that the commercial success was primarily the result of marketing efforts, and to the extent that marketing did play a role, Requester ignores that Owner's marketing focused on the benefits of the claimed features of the '242 patent. *See id.* Requester also fails to identify which unclaimed feature could be responsible for the commercial success. *See id.* Moreover, Requester alleges that every claimed element of the '242 patent was known in the prior art, *see id.*, but in the thousands of pages submitted in this reexamination, Requester tellingly has not identified a single welding-type power supply that incorporates the control power circuit of the Geissler invention.[14] Therefore, the Board should consider Owner's substantial evidence of commercial success, and reverse the Examiner's obviousness

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13 Requester separately notes a purported discrepancy between the Maxstar® 150 Owner's Manual, which states that the power supply can receive "either 115 *or* 230 VAC", and Owner's claim charts, which observe that the power supply can receive a "range of input voltages from 115 Vac *to* 230 Vac." Comments to Response After ACP at 20. The two descriptions, however, are not inconsistent. And Requester does not dispute that the Maxstar® 150 is capable of accepting a range of inputs from "115 Vac to 230Vac."

14 As explained above in Section 7.a.i, Requester instead relies on low-power and UPS references to supply the claimed control power circuit.

rejections.

iii. The '242 Patent Has Been Licensed Throughout the Industry

Licensing, which is another secondary consideration, also supports the conclusion that the '242 patent is nonobvious over the prior art. *WMS*, 184 F.3d at 1360 (Fed. Cir. 1999); *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics*, 976 F.2d 1559, 1575 (Fed. Cir. 1992). Significantly, several competitors of Owner have requested licenses to make, use and sell certain products covered by this patent, and, in turn, Owner granted licenses to those competitors. Stanzel Decl. at ¶ 15. The Board should consider this evidence of licensing, and reverse the Examiner's obviousness rejections.

e. Conclusion

For the foregoing reasons, the Board should reverse the pending rejections and confirm the patentability of claims 1–59 of U.S. Patent No. 6,987,242.

- Claims 1–59 are not obvious based on the proposed combinations, because:
    - Chambers '024 and Miller '011, which are relied on for their disclosure of control power circuitry, are not analogous art.
    - The Examiner miscast the Geissler invention as merely providing control power and failed to articulate any reason why a person of ordinary skill would have combined Chambers '024 or Miller '011 with the Primary references.
    - Chambers '024 and Miller '011 either do not teach the claimed control power circuitry, or teach away from any combination with the Primary References.
    - Significant secondary considerations demonstrate that the claimed invention was nonobvious.
- Claims 3–9, 12–18, 21–27, 35–41, 44–50, and 53–59 are also not obvious based on the proposed combinations, because these claims recite a unique combination of control power circuitry and a second dc bus that has a magnitude that is both greater than and independent of the rectified input. This combination is not taught or otherwise suggested by the cited references.

DATED: October 3, 2009

Respectfully submitted,

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1. (Thrice Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:

an input circuit configured to receive an input power signal having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude;

a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude;

an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input magnitude [voltage];

a preregulator controller, connected to the preregulator, having a power factor correction circuit, and further having a controller power input; [and]

a control power circuit configured to receive the dc second signal and provide a [control] controller power signal to the controller power input, wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency;

wherein the control power circuit includes a first set of circuit elements used to derive control power at start up independent of the input magnitude and a second set of circuit elements used to derive control power only after start-up; and

providing the control power to a controller configured to control the output power.

2. The apparatus of claim 1, wherein the input circuit includes a rectifier.

3. The apparatus of claim 1, wherein the preregulator magnitude is greater than the first magnitude.

4. The apparatus of claim 3, wherein the preregulator includes a boost converter.

5. The apparatus of claim 4, wherein the boost converter includes a slow voltage switched switch and a slow current switched switch.

6. The apparatus of claim 3, wherein the output circuit includes an inverter.

7. The apparatus of claim 3 wherein the output circuit includes a switched snubber.

8. The apparatus of claim 3, wherein the preregulator magnitude is greater than the control power magnitude.

9. The apparatus of claim 3 wherein the control power circuit includes a buck converter.

10. (Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:

receiving an input power signal having an input frequency and an

input magnitude;

providing a first signal having a magnitude responsive to the input magnitude;

converting and power factor correcting, by controlling a switch, the first signal into a dc second signal having, a second magnitude independent of the input magnitude;

providing an output power signal derived from the dc second signal, wherein the output power signal is a welding type output and has an output frequency independent of the input frequency and further has an output voltage independent of the input magnitude [voltage]; and

converting the dc second signal into control power using a first set of circuit elements to derive control power at start up and a second set of circuit elements to derive control power only after start-up; and

wherein the control power has a control power magnitude independent of the input magnitude.

11. The method of claim 10, wherein providing a first signal includes rectifying an ac signal.

12. The method of claim 10, wherein the second magnitude is greater than the first magnitude.

13. The method of claim 12, wherein converting the first signal into a dc second signal includes boost converting the first signal.

14. The method of claim 12, wherein boost converting the first signal includes a slow voltage switching and slow current switching a switch.

15. The method of claim 12, wherein providing an output power signal includes inverting the dc second signal.

16. The method of claim 13 wherein inverting the dc second signal includes switching a snubber.

17. The method of claim 12, wherein the second magnitude is greater than the control power magnitude.

18. The method of claim 12 wherein converting the dc second signal into control power includes buck converting the dc second signal.

19. (Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:

input means for receiving an input power signal having an input frequency and an input magnitude and for providing a first signal having a magnitude responsive to the input magnitude;

converting means for converting, and power factor correcting by controlling a switch, the first signal into a dc second signal having magnitude independent of the input magnitude wherein the converting means is connected to receive the first signal;

means for providing a welding type output power signal derived from the dc second signal, wherein the output power signal [and] has an output frequency independent of the input frequency and further has an output voltage independent of the input magnitude [voltage], and wherein the means for providing an output power signal is disposed to receive the dc second signal;

means for converting the dc second signal into control power, including a first set of circuit elements to derive control power at start up and a second set of circuit elements to derive control power only after start-up, wherein the control power has a control power magnitude independent of the input magnitude.

20. The apparatus of claim 19, wherein the first means includes means for rectifying an ac signal.

21. The apparatus of claim 20, wherein the convertor magnitude is greater than the first magnitude.

22. The apparatus of claim 21, wherein the converting means includes means for boost converting the first signal.

23. The apparatus of claim 22, wherein the means for boost converting includes means for slow voltage switching and slow current switching a switch.

24. The apparatus of claim 23, wherein the means for providing an output power signal includes means for inverting the dc second signal.

25. The apparatus of claim 24 wherein the means for inverting includes means for switching a snubber.

26. The apparatus of claim 25, wherein the converter magnitude is greater than the control power magnitude.

27. The apparatus of claim 26 wherein the means for converting the dc second signal into control power includes means for buck converting the dc second signal.

28. (Twice Amended) A welding type power source capable of receiving <u>any input voltage and input frequency in</u> a range of input voltages and frequencies, comprising:

a dc bus;

an output circuit configured, having a control input and to receive the dc bus and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input voltage;

a controller, including a power factor correction circuit, connected to [the] <u>a</u> control input and further having a controller power input;

and a control power circuit configured to receive the dc bus and provide a control power signal to the controller power input<u>, having a first set of circuit elements to derive control power at start up from the range of input voltages and a second set of circuit elements to derive control power only after start-up</u>.

29. The apparatus of claim 28, wherein the output circuit includes an inverter.

30. The apparatus of claim 29, wherein the output circuit includes a switched snubber.

31. The apparatus of claim 28, wherein the dc bus has a magnitude is

greater than a magnitude of the control power signal.

32. The apparatus of claim 28 wherein the control power circuit includes a buck converter.

33. (Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:

an input circuit configured to receive an input power signal having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude;

a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude;

an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input magnitude [voltage];

a preregulator controller, connected to the preregulator, and further having a controller power input; and

a control power circuit configured to receive the dc second signal and provide a control power signal to the controller power input, wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency, without reconfiguring the control power circuit and having a first set of circuit elements to derive control power at start up from the range of input voltages and a second set of circuit elements to derive control power only after start-up.

34. The apparatus of claim 33, wherein the input circuit includes a rectifier.

35. The apparatus of claim 33, wherein the preregulator magnitude is greater than the first magnitude.

36. The apparatus of claim 35, wherein the preregulator includes a boost converter.

37. The apparatus of claim 36, wherein the boost converter includes a slow voltage switched switch and a slow current switched switch.

38. The apparatus of claim 35, wherein the output circuit includes an inverter.

39. The apparatus of claim 35 wherein the output circuit includes a switched snubber.

40. The apparatus of claim 35, wherein the preregulator magnitude is greater than the control power magnitude.

41. The apparatus of claim 35 wherein the control power circuit includes a buck converter.

42. (Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:

receiving an input power signal having an input frequency and an

input magnitude;

providing a first signal having a magnitude responsive to the input magnitude;

converting the first signal into a dc second signal having a second magnitude independent of the input magnitude;

providing an output power signal derived from the dc second signal, wherein the output power signal is a welding type output and has an output frequency independent of the input frequency and further has an output voltage independent of the input magnitude [voltage]; and

converting the dc second signal into control power, without reconfiguring a control power circuit, wherein the control power has a control power magnitude independent of the input magnitude using a first set of circuit elements to derive control power at start up and a second set of circuit elements to derive control power only after start-up.

43. The method of claim 42, wherein providing a first signal includes rectifying an ac signal.

44. The method of claim 42, wherein the second magnitude is greater than the first magnitude.

45. The method of claim 44, wherein converting the first signal into a dc second signal includes boost converting the first signal.

46. The method of claim 44, wherein boost converting the first signal includes a slow voltage switching and slow current switching a switch.

47. The method of claim 44, wherein providing an output power signal includes inverting the dc second signal.

48. The method of claim 44, wherein inverting the dc second signal includes switching a snubber.

49. The method of claim 44, wherein the second magnitude is greater than the control power magnitude.

50. The method of claim 44, wherein converting the dc second signal into control power includes buck converting, the dc second signal.

51. A welding type power source capable of receiving a range of input voltages and frequencies, comprising: input means for receiving an input power signal having an input frequency and an input magnitude and for providing a first signal having a magnitude responsive to the input magnitude; converting means for converting the first signal into a dc second signal having a magnitude independent of the input magnitude, wherein the converting means is connected to receive the first signal; means for providing a welding type output power signal derived from the dc second signal, wherein the output power signal and has an output frequency independent of the input frequency and further has an output voltage independent of the input voltage, and wherein the means for providing an output power signal is disposed to receive the dc second signal; means for converting the dc second signal into control power, without reconfiguring, wherein the control power has a control power magnitude independent of the input magnitude.

52. The apparatus of claim 51, wherein the first means includes means for

rectifying an ac signal.

53. The apparatus of claim 52, wherein the convertor magnitude is greater than the first magnitude.

54. The apparatus of claim 53, wherein the converting means includes means for boost converting the first signal.

55. The apparatus of claim 54, wherein the means for boost converting includes means for slow voltage switching and slow current switching a switch.

56. The apparatus of claim 55, wherein the means for providing an output power signal includes means for inverting the dc second signal.

57. The apparatus of claim 56, wherein the means for inverting includes means for switching a snubber.

58. The apparatus of claim 57, wherein the converter magnitude is greater than the control power magnitude.

59. The apparatus of claim 58 wherein the means for converting the dc second signal into control power includes means for buck converting the dc second signal.

9. EVIDENCE APPENDIX

- Exhibit A, Declaration of Thomas Lipo, PhD, In Support of Response to First Office Action For U.S. Patent Nos. 6,987,242, 6,849,827, 6,329,636, 6,815,639, and 7,049,546, was submitted Aug. 7, 2007 by Owner in their Response to the first Action.
- Exhibit B, Declaration of David Stanzel In Support of Response to First Office Action For U.S. Patent Nos. 6,987,242, 6,849,827, 6,329,636, 6,815,639, and 7,049,546, was submitted Aug. 7, 2007 by Owner in their Response to the first Action.
- Exhibit C, Auto-LineTM Brochure, was submitted Aug. 7, 2007 by Owner in their Response to the first Action.
- Exhibit D, Declaration of Michael Madsen in Support of Response to ACP For U.S. Patent Nos. 6,987,242, 6,329,636, and 6,815,639 was submitted by Owner in Response to the ACP on March 20, 2009.
- Exhibit E, Declaration of Steven J. Geissler Under 37 C.F.R. 1.131, was submitted Aug. 7, 2007 by Owner in their Response to the first Action.
- Exhibit F, Printout Corresponding to Geissler Declaration, was a page missing from a copy of a declaration submitted Aug. 7, 2007 by Owner in their Response to the first Action, is the subject of an accompanying petition, and was submitted in 09/969535 on March 26, 2003.

10. RELATED PROCEEDINGS APPENDIX

There are no decisions by the Board in related proceedings.

11. CERTIFICATE OF COMPLIANCE WITH WORD LIMIT

The undersigned hereby certifies that Sections 1–7 of the foregoing Appellant-Owner's Brief, including footnotes, contain 13,505 words, and that the Brief complies with the 14,000-word limit set forth in 37 C.F.R. § 1.943(c). For the Patent Office's reference, the total number of words in each section, as counted by Microsoft Word 2000, are listed below:

Section	Words
Table of Contents	453
Table of Authorities	190
Table of Cited References	116
Section 1	60
Section 2	238
Section 3	24
Section 4	121
Section 5	3029
Section 6	359
Section 7	9674

Exhibit F is a single page from a declaration filed in a related prior application. All but that single page was considered by the Examiner, and is attached as Exhibit E. The single page of Exhibit F is the subject of an accompanying petition to have it be admitted as part of the record. To the extent it is counted towards the word limit, as part of a related application filing, it contains 159 words. Adding this to the total for sections 1-7 results in 13,664, which complies with the 14,000 word limit.

DATED: October 3, 2009

Respectfully submitted,

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12. CERTIFICATE OF SERVICE

The undersigned hereby certifies under penalty of perjury under the laws of the State of Wisconsin, that on October 3, 2009 he caused the foregoing Respondent Brief, Exhibits, Petition, Petition Exhibit, and certificate of mailing to be served, via U.S. Mail, First Class, on:

Paul Hasting Janofsky & Walker LLP
815 15th Street N.W.
Washington, DC 20005

DATED: October 3, 2009

Respectfully submitted,

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Exhibit A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Reexamination of:	Control No.: 95/000,205
Geissler/Thommes	Examiner: Kiley Stoner
U.S. Patent Nos. 6,987,242, 6,849,827, 6,329,636, 6,815,639 AND 7,049,546	
Issue Date: January 17, 2006	
Issued To: Illinois Tool Works Inc.	
Attorney Docket No.:	

DECLARATION OF THOMAS LIPO, PH.D, IN SUPPORT OF RESPONSE TO FIRST OFFICE ACTION FOR U.S. PATENT NOS. 6,987,242, 6,849,827, 6,329,636, 6,815,639 and 7,049,546

Mail Stop *Inter Partes* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. Background

1. I make this declaration in support of the First Office Actions For U.S. Patents Nos. 7,049,242, 6,849,827, 6,320,636, 6,987,242 and 7,049,546, filed herewith (hereinafter "Accompanying Materials"). Any abbreviations or capitalized terms used herein have the same meaning as those in the Accompanying Materials.
2. Since 1981, I have been a tenured professor at the University of Wisconsin, Madison, Wisconsin, my current position being the W.W. Grainger Professor of Power Electronics and Electrical Machines. I received my B.E.E. and M.S.E.E. degrees from Marquette University, Milwaukee, WI in 1962 and 1964 respectively. I obtained the Ph.D. degree in electrical engineering from the University of Wisconsin in 1968.
3. I am also Co-Director of the Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC) a coalition of academics and more than 50 companies that work in the field of power electronics.
4. I have acted as a consultant to over 25 companies as well as the Department of Energy, the Department of Commerce, the United Nations International Development Organization (UNIDO), the Defense Advanced Research Projects Agency (DARPA), the Office of Naval Research (ONR) and the Electric Power Research Institute (EPRI).
5. From 1969 to 1979 I was an Electrical Engineer in the Power Electronics Laboratory of Corporate Research and Development of the General Electric Company. While at General Electric, I helped pioneer the computer simulation of many types of converter systems including cycloconverters, pulse width modulated voltage inverters, auto-sequentially commutated (ASCI) current source inverters (CSIs), third harmonic commutated CSI inverters and load commutated converters. I also contributed to the analysis and design of a wide range of industrial applications including ac drives for ball mills, pumped hydro, excavators, as well as traction drives for transit cars, locomotives and off-highway vehicles. I have continued my research interests in power electronics at the University of Wisconsin.
6. I am heavily involved in the Institute of Electrical and Electronic Engineers (IEEE). During the early 1990s, I held several high-level positions in the IEEE Industry Application Society, including Society Secretary, Vice President and President. I am a Past Chairman of both the Industrial Drives Committee of Industry Application

Society and the Induction Machine Subcommittee of the IEEE Power Engineering Society and am a working member of three additional IEEE Committees.

7. I have authored or co-authored more than 450 articles, 3 books and 13 book chapters in the field of power electronics. Many of those publications are relevant to the matters I discuss herein, including "Pulse Width Modulation for Power Converters" (2003 book), and "Improvements in EMI Performance of Inverter-Fed Motor Drives" (1995 article) and "A Three-Level MOSFET Inverter for Low Power Drives" (2004 article). I have received over 30 IEEE prize paper awards for this work including co-recipient of the Best Paper Award in the IEEE Industry Applications Society Transactions for the years 1984, 1994 and 1998. I have also been an Associate Editor of the journal Electric Machines and Power Systems (1970-1990) and was the Founding Editor of the IEEE Transactions on Power Electronics (1983-1990).
8. I have received numerous awards as part of my work in the field of power electronics, including the Outstanding Achievement Award of the IEEE Industry Applications Society (1986) and the IEEE Third Millennium Medal for Outstanding Achievements and Contributions to Power Electronics.

II. Technical Background of Welding Power Supplies

9. To help place the arguments and references related to the patents at issue into context, I have prepared a brief discussion of welding and welding power supplies.
10. While I primarily discuss welding applications, that technology is also generally applicable to plasma cutting applications.

A. Description of the Welding Process and Welding Power Supplies

11. Welding generally requires a power supply because the available input power level usually must be converted to a welding power level. Generally, the power available from a utility power grid is a high voltage, sinusoidal AC signal ranging from 120V to 600V, with a relatively low current compared to welding current. *See* Exhibit 1 (American National Standards Institute (ANSI) AC Voltage Rating Tabulation). Welding often requires currents between 100A and 1000A. U.S. Pat. No. 6,023,037 at 2:2-3, assigned to Lincoln Global, Inc., (hereinafter "Requester's '037 patent"); *see also* U.S. Pat. No. 6,177,645 at 2:5-9, assigned to Lincoln Global, Inc., (hereinafter "Requester's '645 patent"). Therefore, a power supply is required to transform the relatively high voltage, low current signal to a low voltage, high current signal needed for welding.

12. Below I discuss several other characteristics that may be desirable in a welding power supply, including portability, the ability to operate over a continuous range of input voltages, and the ability to efficiently supply reliable control power.

B. Need for Portable Welding Supplies

13. Although a welder is often useful in many different locations within a particular job site, older welders were not very portable.
14. This is largely because the welding power supply was relatively large and heavy. In order to produce the required output power, a welding power supply traditionally included a large, heavy iron core transformer wrapped with hundreds of turns of copper wire. The weight and physical size of the transformer, and thus the power supply, was determined by the number of turns of wire and the cross-sectional area of the core, which was dictated by the voltage being applied, the frequency of the primary power, the output voltage requirements, and the output current requirements for welding.
15. Because of the size and weight of these iron core transformers, welding power supplies were generally too large to be readily portable, and thus deemed stationary. Most DC welding machines also had an inductor which was large and heavy, in part because of the primary power frequency. This lack of portability was a significant problem in many industries because often the particular welding job could not be completed at a fixed location, but instead needed to be completed on the job site at remote locations -- ships, off-shore oil rigs, and in buildings high above the ground. And while companies developed smaller and lighter power supplies using smaller transformers for other industries, the power output of these supplies were often inadequate for many welding applications.
16. The advent of the inverter-power supply for welding applications was a significant breakthrough in this area. Inverter-power supplies were used by Miller Electric to reduce the size of the transformer and inductor it used in its power supplies without sacrificing welding power.
17. I have been informed that certain of Owner's products use a two-stage inverter power supply with a boost converter. Rather than supply the low frequency (*e.g.*, 50-60 Hz) AC directly to the primary side of the large transformer, an inverter power supply developed by Owner utilizes several intermediate power conversions, including the conversion to a high frequency AC voltage. This is accomplished through the high-

speed on/off action of high power solid-state switches, creating a high frequency AC signal, having a frequency of, for example, 50,000 Hz. The frequency of the inverter switches is set by a controller. This high frequency AC signal is fed into the primary side of the transformer, allowing for a reduction in the size and weight of the transformer. This increase in frequency allows for a reduction in the size and weight of the transformer.

C. Need for Ability to Receive a Range of Input Voltages

18. Today's arc welders and plasma arc cutters are used in a wide array of industrial and commercial settings, including locations where power is readily available and reliable at various voltage levels, locations where power is readily available but only at a single voltage level, as well as in situations where power is "dirty" (*e.g.* voltages fluctuate over short time periods, thereby causing the welding output to fluctuate). This last situation occurs where power is not reliable, especially in remote areas, where power is only available via generator. Further, even where power is readily available, such as in large manufacturing plants, such power may nonetheless be "dirty," as a result of a large and varying amount of equipment on the power source.
19. In international settings, the range of discrete input voltage levels can vary even more than those available in the U.S., and the frequency of the supplied input power can be yet another variable, in that it can vary across different countries' standards. Because of these factors, welding and cutting equipment must be capable of reliably and effectively utilizing such varied input power.
20. The need for power supplies with the ability to handle multiple input power levels was further highlighted by the development of the portable lightweight inverter-based welding power supplies discussed above. With inverter power supplies, a welder operator could more easily move his equipment to the various work sites, but now the operator needed to be able to have a power supply that could handle multiple input voltages and, potentially, dirty power conditions.
21. Prior to the development of the '546 and related patents, the main approach to solving the problem of multiple input voltages was either to have multiple machines for each voltage input, or to have a single machine that would have to be physically modified to accept differing inputs. This latter approach was referred to as using a reconnection scheme, wherein an operator (or person installing the equipment) would physically relink the transformer-based power supplies to accommodate the required

input voltage. However, such a reconnection scheme used precious labor hours, and carried a risk of significant damage to the power supply if it was relinked incorrectly.

D. Need for Power Factor Correction

22. Power factor is defined as the ratio of the real power demanded by the load to the apparent power seen by the source. If a load is purely resistive, the power factor is equal to 1.0, which means that all of the apparent power delivered from the source is consumed by the load. However, if a load is not purely resistive (*i.e.*, if it is reactive), a time or shape difference exists between the voltage and current waveforms. This results in apparent power supplied by the source, but not efficiently used by the load. Thus, where the power factor is below 1.0, the source is required to deliver more apparent power than what is actually used by the load, and may result in an additional cost imposed by the power utility. Further, a good power factor lowers peak amperage draw and reduces harmonics, plus the relative amperage and voltage magnitudes are in synch, both of which may enable adding more loads (*i.e.*, welders) or more output for one welder for a given primary power, further increasing productivity and allowing more welding power from a given electrical power source. Good power factor is important, regardless of the job site, available source voltage or source frequency amperage, because of the highly reactive nature of welding power supplies.

23. Power factor correction is the technique of counteracting the reactive components of a load that results in a power factor of less than 1.0. There are several ways to increase the power factor of a given load. One technique, called "passive" power factor correction, consists of adding reactive components (*i.e.*, inductors and capacitors) to a power supply to balance out known reactive components (*i.e.*, inductors and capacitors) in the power supply. Another technique is known as "active" power factor correction, whereby the input current is controlled such that it is proportional and in phase with the input voltage. Active power factor correction is generally more effective than passive power factor correction because the reactive characteristics of the power supply vary based on the output power demanded by the load.

E. The Need For the Efficient Delivery of Reliable Control Power Over a Range of Input Voltages

24. As stated above, a controller is an essential component of an inverter power supply, which needs its own power input (referred to herein as "control power"). Upon the development of inverter-type welding power supplies that could be used over a range of input voltages, there was a strong need for the delivery of a consistent and efficient control power over that same range of input voltages. Early welding power supplies supplied control power either with mechanical contacts, or by adopting basic voltage-limiting circuitry.

1. Problems Inherent in a Mechanical Contact Solution

25. Early inverter power supplies that were capable of receiving a range of input voltages relied on mechanical contacts to provide a consistent voltage signal to a controller. However, there are problems inherent to this mechanical solution.
26. The main problem inherent to a mechanical contact solution lies in the tiered operation of such a mechanical system, which is incapable of keeping pace with near instantaneous changes in input voltage.
27. Generally speaking, the mechanical contacts correspond to a discrete voltage signal. For instance, if the input voltage is 230V, the mechanical system will engage the contact associated with a 230V signal. However, this means that the mechanical system can only precisely account for discrete voltage levels. Thus, a given power source providing power at a voltage level between two tap levels could cause an over-voltage or an under-voltage.
28. For instance, if a power source provided 450V to a system with taps at 380V and 460V, the mechanical system would select the 460V tap level. However, as described above, the input power can fluctuate over time, especially where the input power source is a generator. If a generator supplying power at 450V experiences a sudden drop in voltage to 390V, the mechanical system might associate the input power with a 380V tap. If the voltage level then rises to the previous 450V level, the mechanical tap would move back to the 460V tap, but there would be a delay as the mechanical system is slower than the voltage shift, which can happen almost instantaneously. This would result in a momentary, but significant, improper voltage supply from the mechanical system, which has the potential to damage the controller or cause incorrect function.
29. While it is possible to use an over-voltage protection circuit, the operations of such circuits generally result in a shutdown of the welder (requiring diagnosis, and

resulting in lost labor time). Additionally, if a voltage level drops and the mechanical system cannot move quickly enough, the controller might be supplied with insufficient voltage, causing it to shut down, again, resulting in a stoppage in welding output. To remedy this problem, a delay can be built into the system, which prevents the mechanical system from switching taps for a specified period of time. However, this results in yet another undesired outcome, *i.e.*, an increased risk of controller damage as a legitimate voltage level change would expose the controller to an improperly high or low voltage for a longer time period.

30. An additional, more basic problem with mechanical contacts occurs when the welding power supply is jostled or bumped. The risk of such a situation is greatly increased where the power supply is readily portable, as it is more likely to be placed on surfaces that are subject to mechanical vibrations, such as in proximity to high-output generator motors or at construction sites, or on surfaces that are themselves moving, such as on a floating oil rig at sea. In such instances, the mechanical contacts can be bumped loose, which result in an improper connection, leading to an improper voltage supplied to the controller. A controller that receives an improper voltage can be damaged if it receives an over-voltage, or can turn off because it receives an insufficient voltage.

2. Problems Inherent in Adopting Single Input Technology in Multiple Input Systems

31. In addition to the mechanical contact solution, it was also known to use a linear regulator to convert a DC bus voltage to a proper control voltage for machines with multiple input voltages. However, a linear regulator also suffers from a dissipated voltage, which causes power loss. For instance, a linear regulator can convert a 24V bus to a 18V control power signal, which results in a dissipated voltage of 6V. If the current through the linear regulator is 1A, then the total power loss is only 6W. However, if the bus starts at a much higher voltage (as is common in welding power supplies), such as 800V, with the same desired control power voltage of 18V, then the power loss at a 1A current is 782W. Such a large power loss can create excessive heat dissipation in the control circuitry.

3. Problems In Utilizing a DC Bus

32. Another possible solution to provide control power is to efficiently step power down from a known DC voltage. This can be accomplished through the creation of a DC

bus with a known voltage from the input power. Because step-down circuitry would be designed for a single DC bus voltage, the DC bus voltage would have to remain constant, independent of the input voltage level. This approach is problematic when there is a range of input voltages.

33. If the welding power supply has a DC bus with a magnitude independent of the input (such as with a boost-based power supply), control power could easily and efficiently be derived from the DC bus once the bus reached its desired magnitude. However, the creation of the DC bus requires the operation of the controller, which properly controls the boost circuit. *See* the '242 patent at 6:8-9. Therefore, the DC bus requires controller operation, but controller operation requires the creation of the DC bus.

34. This creates a "chicken or egg" problem, where the bus cannot be established until there is control power, and control power is not available until the bus is established.

III. § 103 Rejections

A. The Proper Standard for the One of Ordinary Skill in the Art.

35. I have been informed that the issue of obviousness has been raised in this action, and, in particular, the issue of the proper standard for one of ordinary skill in the art as it relates to the patents at issue.

36. I have been informed that, pursuant to the Patent Office's guidelines, factors that may be considered in determining level of ordinary skill in the art include:

(1) the educational level of the inventor;

(2) type of problems encountered in the art;

(3) prior art solutions to those problems;

(4) rapidity with which innovations are made;

(5) sophistication of the technology; and

(6) educational level of active workers in the field." M.P.E.P. § 2141.03 (*quoting Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696, 218 USPQ 865, 868 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984)).

37. The minimum level of skill in the art for welding, cutting, or heating applications is actually (i) a bachelor's degree in electrical engineering or similar discipline and (ii) three year's of experience with welding, cutting, or heating applications.

38. Because of the unique aspects of welding, cutting and heating, a person of ordinary skill would have a specific background in welding power supplies, rather than simply a general knowledge of power electronics.

B. Low-Power Power Supply Technology is Non-analogous.

39. I understand that the Requester asserts that the "concepts and technology" between low-power power supplies and welding power supplies are analogous. *See e.g.,* the '242 Request at 56.

40. While non-welding, low-power power supplies existed at the time of the invention of Owner's 242 patent, those architectures were not suitable for welding applications. *See* Requester's '132 patent at 1:30-38. This is because, as explained below, demands placed on welding power supplies are unique, and conversion of low-power power supplies would present several problems.

41. First, single voltage input power sources cannot provide a consistent output across different input voltages, and the components in these power supplies that operate safely at a particular input level can be damaged when operating at an alternative input power level.

42. Second, many low-power systems were designed for relatively steady loads. U.S. Pat. App. 11/551,957 at ¶ 6, assigned to Lincoln Global, Inc. Welding, on the other hand, is a very dynamic process. Many variables affect output current and load, including arc length, electrode type, shield type, air currents, dirt on the work piece, puddle size, weld orientation, operator technique and lastly the type of weld process determined to be most suitable for the application. These variables constantly change, and lead to a constantly changing output voltage and current. Moreover, the changes in output are unpredictable and vary unpredictably in magnitude and direction. When the welding community refers to constant voltage, a volt ampere curve shows something much more complex than a regulated voltage. It is actually a voltage and current appropriate for maximized weld processes.

43. Third, "scaling up" low-power power supply technology to meet the demands of welding power supplies presents many problems, such as switching losses, line losses, heat damage, inductive losses, and the creation of electromagnetic interference ("EMI"). Switching losses occur as a switch turns on and off, and, the power through the switch increased, the losses increase in even greater proportion. Reducing the switching frequency could reduce the losses, but when the frequency becomes too low (*e.g.*, less than 16 kHz) it can create audible noise - an unacceptable high pitched whine.

44. Lower switching frequency also increases the size and weight of the power supply. Greater power also increases line losses and core losses (in magnetic components such as transformers and inductors), resulting in lower efficiency.

45. Larger losses create greater heat issues, and heat dissipation is a greater challenge at high power than at low power. Stated differently, a 10% loss at 50W creates a 5W loss which is relatively easy to dissipate, while a 10% loss at 10,000W creates a 1,000W loss which is much more difficult to dissipate, and can result in damage to components.

46. Additionally, as power increases, EMI increases. A low-power circuit is likely to produce EMI well within acceptable limits, but a high power circuit using the same topology will likely run afoul of regulatory standards, and could also cause nearby digital circuitry to malfunction (such as a welding power supply controller).

C. Uninterruptible Power Supply References are Non-Analogous.

47. In addition to not looking to low-power power supplies as analogous art, those of ordinary skill in the art did not regard uninterruptible power supply (UPS) references as with the scope of art applicable to welding because the technical challenges facing welding power supplies is much different from the challenges facing UPS.

48. The problems facing a designer of multi-input welding power supplies include providing a singled desired output current-voltage ("A-V") curve for any input. The welding output is either dc, or ac with a very rapid zero crossing (square wave) to prevent the arc from being extinguished when the voltage crosses zero.

49. Someone skilled in the art of designing welding power supplies would expect that UPS circuits would face challenges of providing a sine wave output that mimics the utility input, making sure consistent output voltage is provided, if battery backup is used making sure the transition is seamless and the output continues to mimic utility power, and to detect if the UPS is failing and bypass the UPS circuitry to directly provide the ac input as an input if a failure occurs.

50. A welding power supply designer would not expect a UPS circuit to receive multiple utility inputs, in part because they would not expect them to be moved from location to location. Moreover, even if a UPS would be designed for multiple inputs, its purpose is to provide an output that mimics the input -- not to provide a single output for any utility input. A welding power supply designer would understand that the

output would vary with the input, which is different from a welding power supply which should provide a single output curve for any input.

51. Because these problems are so different, a welding power supply designer would not look to UPS prior art.

I swear under penalty of perjury that the foregoing is true and correct.

Thomas Lipo

Thomas Lipo, Ph.D

EXHIBIT 1

AC VOLTAGE RATING TABULATION ANSI & NEMA STANDARDS

Nominal System Voltage	Transformer Secondary No-Load Voltage	Equipment Nameplate Rating			
		Motors and Controls	Lamps		Capacitors and Industrial Heating Devices
			Incandescent	Fluorescent and Mercury	
Single Phase Systems					
120 or 120/240	120 or 120/240	115	120	120	120
240 or 120/240	240 or 120/240	230	230	240	240
Three Phase Systems					
120	120	115	120	120	120
208Y/120	208Y/120	200	120 or 208	120	
240	240	230	230 or 250	240	240
480/277	480/277	460		277	480
480	480	460		480/440	480
600	600	575			600

Exhibit B

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Reexamination of:	Control No.: 95/000,205
Geissler/Thommes	Examiner: Kiley Stoner
U.S. Patent No. 6,987,242, 6,849,827, 6,329,636, 6,815,639 AND 7,049,546	
Issue Date: January 17, 2006	
Issued To: Illinois Tool Works Inc.	
Attorney Docket No.:	

DECLARATION OF DAVID STANZEL IN SUPPORT OF RESPONSE TO FIRST OFFICE ACTION FOR U.S. PATENT NOS. 6,987,242, 6,849,827, 6,329,636, 6,815,639 AND 7,049,546

Mail Stop *Inter Partes* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. Background

1. My name is David Stanzel. I work for the Miller Electric Manufacturing Company. My position is Director of Corporate Engineering. My responsibilities at my position include overseeing Technology and Process Development and coordinating various Patent related activities .
2. I graduated from Ohio State in June of 1984 and went directly to work at Miller Electric Mfg. Co. and have worked in a variety of positions over the past 23 years.
3. I make this declaration in support of the First Office Actions For U.S. Patents Nos. 7,049,242, 6,849,827, 6,320,636, 6,987,242 and 7,049,546, filed herewith (hereinafter "Accompanying Materials"). Any abbreviations or capitalized terms used herein have the same meaning as those in the Accompanying Materials.

II. Technical Background of Welding Power Supplies

4. Miller has been able to develop and manufacture inverter-based power supplies for Stick/TIG welding that weigh 13 lbs., and an all-in-one MIG welder that weigh less than 50 lbs.

A. Need for Portable Welding Supplies

5. Certain of Owner's products use a two-stage inverter power supply with a boost converter. Rather than supply the low frequency AC directly to the primary side of the large transformer, an inverter power supply developed by Owner utilizes several intermediate power conversions, including the conversion to a high frequency AC voltage. This is accomplished through the high-speed on/off action of high power solid-state switches, creating a high frequency AC signal, having a frequency of, for example, 50,000 Hz. The frequency of the inverter switches is set by a controller. This high frequency AC signal is fed into the primary side of the transformer.

III. § 103 Rejections

6. Miller Electric is the world's largest manufacturer of arc-welding and cutting equipment.

B. Secondary Considerations Establish That the Patents At Issue Are Not Obvious

1. The Patents At Issue Fulfilled the Long-Felt But Unsolved Need For Reliable, Efficient Control Power For Inverter-Based Power Welding Supplies Over a Wide Range of Voltage Inputs.

7. Products utilizing the control power circuitry are sold as "Auto-Line™" products.

8. Over the last few years, the Auto-Line™ feature has been rapidly expanded and included with a wide range of Miller's welding and cutting products. During that time frame, sales of Auto-Line™ products have risen dramatically. Auto-Line™ feature is a dominant, if not *the* dominant, aspect of those products contributing to their commercial success.
9. I have been informed that in early 2007, Miller learned that certain of its welding power sources were being used by a customer that had experienced operational issues at the jobsite. These products were manufactured by Miller, but did not have the Auto-Line™ technology. Instead they relied on a mechanical linking technology. The customer had experienced power failure at the jobsite. When power was restored, it did not immediately return to the nominal line voltage of 460 V. Instead, it was set, for a short time, to a lower level. Although Miller's products had a circuit delay to prevent improper linkage, the delay time was exceeded and the units linked for 230V. At some later point, power returned to the nominal voltage of 460V. I have been informed that this caused failure of certain of the power supplies. The issue was resolved when Miller immediately provided the parts by the next morning delivery to the jobsite. However, all those involved, including the customer, concluded that Auto-Line™ would likely have prevented these failures.
10. The MaxStar® 150 and MaxStar® 140 graphs provided in the Accompanying Materials present revenue figures for the two products from 1999-2006, which were developed by reviewing revenue figures for those years and products.
11. The MaxStar® 150 incorporated the technology from the patents at issue, while the MaxStar® 140 did not.
12. The MaxStar® 150 does have power factor correction technology, while the The MaxStar® 140 does not.
13. I have reviewed the statements of a customer who field-tested one of Miller's welding products using Auto-Line™ against a welding product called Thermal Arc, which does not utilize Auto-Line™. Those statements are accurately recited in the Accompanying Materials.
14. In the late 1990's the Auto-Line™ feature was field-tested in the Miller's Spectrum 2050 plasma cutter.
15. Multiple competitors of Miller have requested licenses to make, use and sell certain products covered by the patents at issue. Miller granted those competitors licenses, and those licenses are still in force today.

2. Owner's Auto-Line™ Products Embody the Claimed Features

16. Several of the statements below are based on personal and direct discussions with Engineers at Miller Electric Mfg. Co. who have been directly involved in designing and developing welding Power Supplies such as those utilizing the "Auto-Line™" technology.

17. In conjunction with those discussion, we have confirmed that the claims of the 7,049,242, 6,849,827, 6,320,636, 6,987,242 and 7,049,546 discussed in the Accompanying Materials are practiced by the Maxstar 150, and certain other products utilizing "Auto-Line™" technology.

I swear under penalty of perjury that the foregoing is true and correct.

David Stanzel

EXHIBIT C

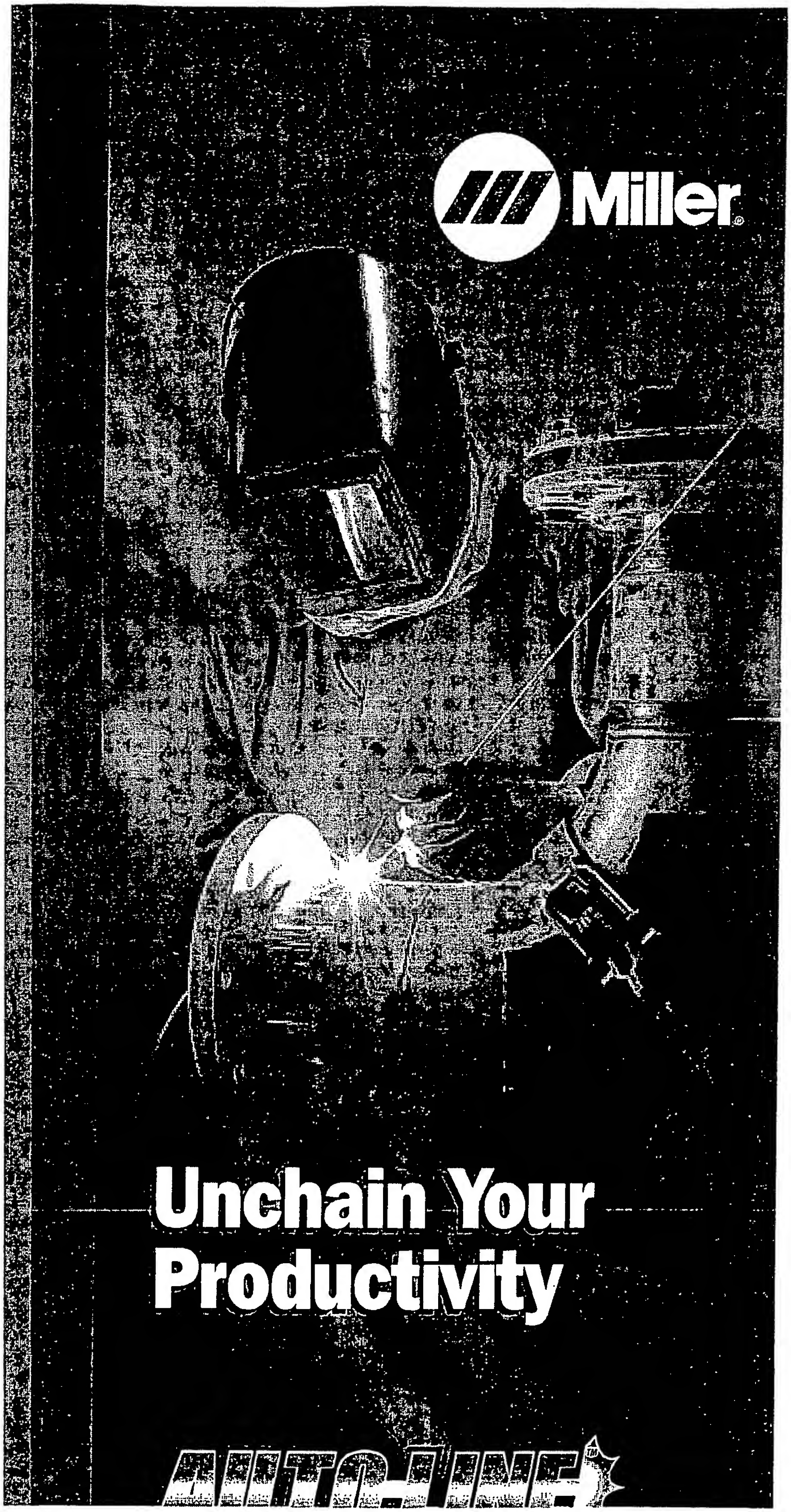

Miller
Unchain Your Productivity

Table Of Contents

Experience the Freedom of Auto-Line™

Now you can set yourself free from the handcuffs of primary power limitations. With Miller's patented Auto-Line technology, primary power management begins at the plug. And ends in your wallet. You get:

- Better weld quality, uninterrupted production
- Universal location flexibility: plug in anywhere
- Lower primary amperage draw
- More welding output on 115 V primary
- Lower utility bills and potential for rebates

AUTO-LINE™
Power Management Technology

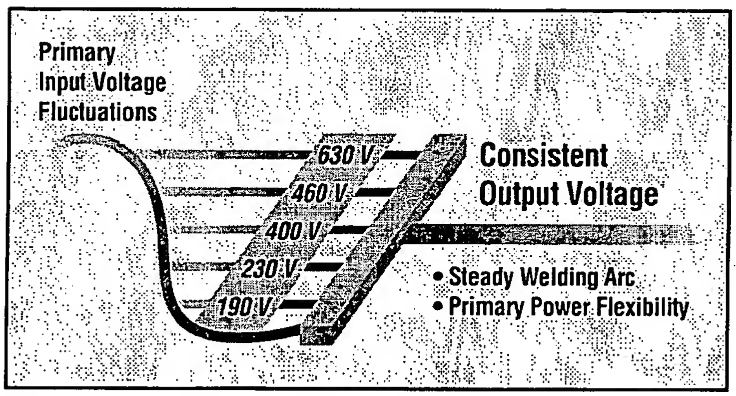
NOT a Linking Technology

Only Miller inverters feature Auto-Line. And make no mistake: Auto-Line significantly raises the performance bar over the older technology of automatic linking. With automatic linking, the power source senses the incoming voltage and automatically configures or "links" the power switching transistors for 230 or 460 V primary. While a step up from removing the machine cover and manually linking jumpers, it still involves mechanical components that are subject to failure. And it can't compensate for voltage spikes or dips beyond ±10 % of nominal.

Primary Power Management

Auto-Line lets you manage primary power for the first time ever. No longer do you have to accept what comes out of the receptacle. Auto-Line provides so many benefits because it essentially enables the welder or plasma cutter to create its own source of primary power.

Here's how it works: Auto-Line technology uses what's known as a "boost converter." This circuit boosts primary input power — from 115 to 575 V or anywhere in between — to a higher voltage. This voltage then charges a capacitor, which is a device used to store and quickly discharge energy. Power for the actual inverter section of the welder comes from this capacitor. In short, it's like drawing water from a well that's always full.



The Auto-Line circuit boosts primary power to a higher, constant voltage. Even if incoming voltage varies widely, the Auto-Line circuit ensures a rock-steady welding or cutting arc.

Better Weld Quality, Uninterrupted Production

Know how your kitchen lights dim when the refrigerator's compressor kicks in? The same thing happens on job sites, in fab shops, manufacturing facilities or when running off generator power. And here's the scary part: you might not even know it until the QA/QC department rejects your weld. Then again, you might know it when a power surge or dip causes your arc to flicker and your inverters to shut down for self protection. In extreme situations, machines with automatic linking have been known to re-link to the wrong power and fail.

But there's no worry with Auto-Line™. It lets you ride effortlessly through "dirty" power. Auto-Line gives you a rock steady arc, "on spec" welding parameters and equipment with an incredibly dynamic, link-free operating range. For products like the XMT® 350 or Axcess™, Auto-Line provides a +37%, -59% operating range — that's an effective 630 VAC surge to a 190 VAC Volt droop on a 460 V line.

"The ability of the XMT 350 to ride through the voltage drop that shut down (other inverters) was proof positive to me of Auto-Line's

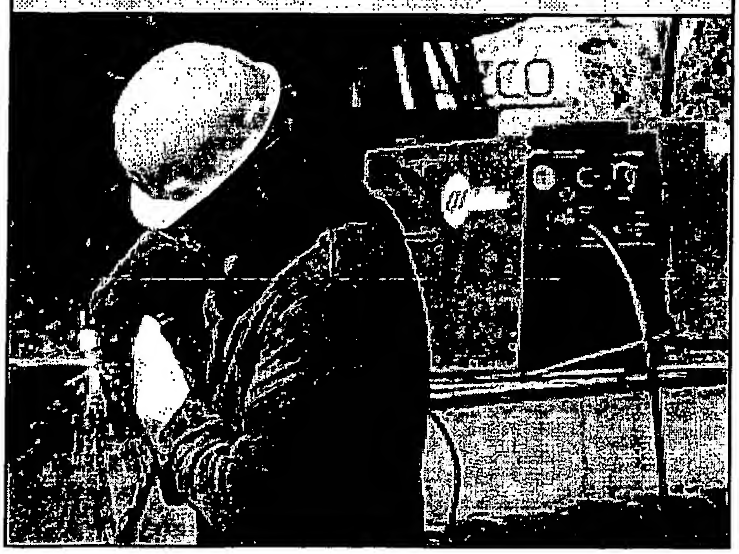
Universal Location Flexibility

Auto-Line permits direct connection to almost any type of input power. 115 V through 575 V. Single- or three-phase. 50 or 60 Hz. Even the third rail of a subway. You'll appreciate the flexibility of Auto-Line when you can't predict the location of your next job. Want to use the same welder in the shop and in the field? Have multi-national production facilities? Or are you just tired of waiting for an electrician to run wiring? Check out these Miller inverters and their Auto-Line capabilities:

- XMT 350 (190 V–630 V, 1- or 3-phase, 50 or 60 Hz)
- Axcess™ Series (190 V–630 V, 1- or 3-phase, 50 or 60 Hz)
- Spectrum® 2050 (190 V–630 V, 1- or 3-phase, 50 or 60 Hz)
- Dynasty® 200 (120–460 V, 1- or 3-phase, 50 or 60 Hz)
- Maxstar® 200 (120–460 V, 1- or 3-phase, 50 or 60 Hz)
- Maxstar® 150 (115–230 V, 1-phase only, 50 or 60 Hz)

AUTO-LINE
Power Management Technology

With a Miller inverter featuring Auto-Line, simply connect the right plug and you're ready to weld or cut anywhere in the world.



The Spectrum 2050, the first inverter ever to feature Auto-Line, gained the respect of contractors for its ability to work wherever they do.

Draw Fewer Amps

Construction sites are notoriously starved for power. Successful fabricators and manufacturers also face the same problem. They've added so much new equipment that there's no power left to run more welding machines without changes to incoming electrical service. That's a problem that could easily cost you $10,000 – $50,000. Or maybe not. As an added benefit, Miller inverters with Auto-Line™ draw far less primary current than other machines.

As a general rule, you can add two Auto-Line CC/CV inverters by retiring just one transformer-type welder. Even in an "apples-to-apples" comparison, it's no contest: On 460 V primary, the XMT 350 draws only 17.8 amps. That's a 25% advantage over competitive inverters, and a big bonus for you. On a 100-amp breaker, you can add five XMTs, but just four competitive machines.

When it comes to Miller TIG inverters, Auto-Line rewrites the primary power rule book. In fact, you can run four Dynasty 200s on less power than it takes to run a 250-amp conventional TIG unit. That's because the Dynasty 200 draws a mere 16 amps on a 230 V, single-phase line. And remember that Auto-Line enables using three-phase power, which further improves efficiency.

AUTO-LINE
Power Management Technology

Low primary amp draw benefits contractors, too. If you run an Auto-Line inverter off a generator, or if you run long secondary weld cables, there's much less worry about tripping the breaker.

The low amp draw of the Dynasty 200 DX with Auto-Line enabled this fabricator to add eight more TIG machines without any changes to an already stressed primary service.

The Most Power Per Pound

Miller's Auto-Line circuit provides near perfect Power Factor. In everyday terms, this means you get the maximum output for a given primary current draw. As a result, the Maxstar 150 can produce 30 percent more welding power than competitive machines on 115 V primary. The Maxstar 150 can weld at approximately 110 amps, or enough power to run 1/8-in. E7018 Stick electrode — a feat no other inverter in its class can accomplish. For the same reason, the Dynasty 200 is the only inverter than can weld aluminum at up to 125 amps on 115 V primary.

AUTO-LINE

Power Management Technology

Miller TIG inverters with Auto-Line offer unmatched portability and convenience. The Maxstar 150 weighs less than 14 lbs. and the Dynasty 200 weighs just 45 lbs.

The Maxstar 150 with Auto-Line gives this mechanical contractor the power to run larger Stick electrodes that other inverters simply can't handle.

Utility Rebates, Anyone?

Near perfect power factor may have another benefit, too. Utility companies often reward those who use energy efficiently. They do this through rebates for purchasing efficient equipment, and more often through cost penalties for inefficiency. Since no other welding equipment can match the performance of Auto-Line, Miller inverters put you in the best position possible.

AUTO-LINE
Power Management Technology

Miller inverters with Auto-Line could lower your utility bill by hundreds or thousands of dollars, and you might be in a position to get utility rebates.

Benefits by Market Segment

Power Source	Manufacturing/ Fabrication	Structural Construction	Mechanical Contractor	Maintenance Repair
XMT 350	~ ∞ ↓ $	~ ∞ ↓	~ ∞ ↓	∞ ↓
Spectrum 2050	~ ∞	~ ∞ ↓	~ ∞ ↓	∞ ↓
Maxstar 200	~ ∞ ↓ $		∞ ↓ ↑	∞ ↓ ↑
Maxstar 150			∞ ↓ ↑	∞ ↓ ↑
Dynasty 200	~ ∞ ↓ $		∞ ↑	∞ ↓ ↑
Axcess Series	~ ↓ $			

Key

- ~ Ride through power dips and spikes
- ∞ Universal location flexibility; plug in anywhere
- ↓ Lower primary amperage draw
- ↑ More welding output on 115 V primary
- $ Potential for utility rebates

For detailed specification sheets or to locate your nearest Miller distributor, call:

1-800-4-A-Miller
(1-800-426-4553)

www.MillerWelds.com

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EXHIBIT D

MADSEN DECLARATION

Appl. No. 95/000,202

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Steven J. Geissler
Control No.	:	95/000,202
Filing Date	:	January 17, 2007
Title	:	Method And Apparatus For Receiving A Universal Input Voltage In A Welding, Plasma Or Heating Power Source
Art Unit	:	3992 .
Examiner	:	Linh M. Nguyen
Docket No.	:	ITW 8637R

DECLARATION OF MICHAEL MADSEN IN SUPPORT OF RESPONSE TO ACP FOR U.S. PATENT NOS. 6,987,242, 6,329,636 AND 6,815,639

Mail Stop *Inter partes* Reexam
Attn: Central Reexam Unit
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. My name is Michael Madsen. I work for the Miller Electric Manufacturing Company. My position is Engineering Manager, Corporate Engineering Equipment Technology. My responsibilities at my position include overseeing Technology Development and coordinating various Patent related activities. During the course of my job I have occasion to review and understand patents and patent claims

2. I graduated from Milwaukee School of Engineering in 1987 and went directly to work at Miller Electric Mfg. Co. and have worked in a variety of positions, all of them in engineering, over the past 22 years.

3. I make this declaration in support of the response to the ACP for the reexaminations of U.S. Patents Nos. 6,987,242, 6,329,636 and 6,815,639, filed herewith.

4. I have read and agree with the contents of the DECLARATION OF DAVID STANZEL IN SUPPORT OF RESPONSE TO FIRST OFFICE ACTION filed in the reexaminations of U.S. Patents Nos. 6,987,242, 6,329,636 and 6,815,639.

5. The attached claim charts accurately reflects my comparison of the amended independent claims of U.S. Patents Nos. 6,987,242, 6,329,636 and 6,815,639, and the Miller MaxStar® 150. They show that the Miller MaxStar® 150 is within independent claims of U.S. Patents Nos. 6,987,242, 6,329,636 and 6,815,639.

6. The propagation delay for a welding power supply control circuit, at the time patent 6,329,636 was filed was on the order of 0.2 to 0.5 microseconds. One skilled in the art of designing welding power supplies would be aware of the propagation delay and consider it when designing a welding power supply.

Respectfully Submitted

Michael D Madsen

Michael Madsen

MARCH 19, 2009

*DN*D:\CLF\ITW\8637R\8637RresponseACP Madsen Decl.wpd Wednesday, March 18, 2009 3:30PM

CLAIM CHART ATTACHED TO DECLARATION OF MICHAEL MADSEN IN SUPPORT OF RESPONSE TO ACP FOR U.S. PATENT NOS. 6,329,636, 6,815,639 and 6,987,242,

Patent 6359636	
1. (Twice Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source that can receive a range of input voltages from 115Vac to 230 Vac. It can also receive a range of frequencies, including from 50Hz to 60Hz.
an input circuit configured to receive an input power signal having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 has an input rectifier circuit that receives input power. The output of the rectifier has a magnitude responsive to the input signal magnitude.
a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a preregulator that receives the rectified signal and provide a dc bus. The bus magnitude is independent of the input magnitude.
an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input <u>magnitude</u> [voltage];	The Miller MaxStar® 150 has an output circuit that receives the dc bus and provides a welding power signal with a frequency and magnitude independent of the input frequency and magnitude.
a preregulator controller, connected to the preregulator, and further having a controller power input; and	The Miller MaxStar® 150 includes a preregulator controller that is connected to the preregulator, and that has a controller power input.

a control power circuit configured to receive the dc second signal and provide a control power signal to the controller power input, wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency, and further wherein the control power circuit includes start up circuitry that provides control power independent of the input magnitude at start-up, and further includes after start up circuitry that is used to provide control power only after start up.	The Miller MaxStar® 150 has a control power circuit that receives the dc bus and provides a control power signal to the controller power input. The control power signal has a control power magnitude and frequency independent of the input magnitude and frequency. The control power circuit includes start up circuitry that provides control power independent of the input magnitude at start-up, and further includes after start up circuitry that is used to provide control power only after start up.
11. (Twice Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
receiving an input power signal having an input frequency and an input magnitude;	The Miller MaxStar® 150 receives an input power signal.
providing a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 provides a rectified signal having a magnitude responsive to the magnitude of the input.
converting the first signal into a dc second signal having a second magnitude independent of the input magnitude;	The Miller MaxStar® 150 converts the rectified signal into a dc bus having a magnitude independent of the input magnitude.
providing an output power signal derived from the dc second signal, wherein the output power signal is a welding type output and has an output frequency independent of the input frequency and further has an output voltage independent of the input magnitude [voltage]; and	The Miller MaxStar® 150 provides a welding power output derived from the dc bus. The welding power output has an output frequency and magnitude independent of the input frequency and magnitude.

CLAIM CHART ATTACHED TO DECLARATION OF MICHAEL MADSEN IN SUPPORT OF RESPONSE TO ACP FOR U.S. PATENT NOS. 6,329,636, 6,815,639 and 6,987,242

converting the dc second signal into control power, wherein the control power has a control power magnitude independent of the input magnitude <u>and further wherein the control power is provided using start up circuitry that provides control power independent of the input magnitude at start-up, and using after start up circuitry to provide the control power only after start-up</u>.	The Miller MaxStar® 150 converts the dc bus into control power, and the control power has a magnitude independent of the input magnitude. The control power is provided using start up circuitry that provides control power independent of the input magnitude at start-up, and using after start up circuitry to provide the control power only after start-up.
21. A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
input means for receiving an input power signal having an input frequency and an input magnitude and for providing a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 has a rectifier that receives input power and provides a rectified signal having a magnitude responsive to the input magnitude.
converting means for converting the first signal into a dc second signal having a magnitude independent of the input magnitude, wherein the converting means is connected to receive the first signal;	The Miller MaxStar® 150 includes a boost converter that receives and converts the rectified signal into a dc bus having a magnitude independent of the input magnitude.
means for providing a welding type output power signal derived from the dc second signal, wherein the output power signal and has an output frequency independent of the input frequency and further has an output voltage independent of the input voltage, and wherein the means for providing an output power signal is disposed to receive the dc second signal;	The Miller MaxStar® 150 includes an output circuit that receives the dc bus, inverts it, and provides a welding output. The output power has a frequency and voltage independent of the input frequency and input voltage.

CLAIM CHART ATTACHED TO DECLARATION OF MICHAEL MADSEN IN SUPPORT OF RESPONSE TO ACP FOR U.S. PATENT NOS. 6,329,636, 6,815,639 and 6,987,242

means for converting the dc second signal into control power, wherein the control power has a control power magnitude independent of the input magnitude	The Miller MaxStar® 150 converts the boosted dc bus to provide control power. The control power has a magnitude less than and independent of the boosted dc bus magnitude, and a control frequency independent of the input frequency. The Miller MaxStar® 150 derives control power at start up from start up circuitry and from after start up circuitry only after start-up.
30. (Amended) A welding type power source capable of receiving <u>an input voltage and an input frequency from</u> a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
a dc bus;	The Miller MaxStar® 150 includes a dc bus.
an output circuit configured, having a control input and to receive the dc bus and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input voltage;	The Miller MaxStar® 150 includes an output circuit that has a control input and receives the dc bus to provide welding power. The welding power has an output frequency and voltage independent of the input frequency and voltage;
a controller, connected to the control input and further having a controller power input; and	The Miller MaxStar® 150 includes a controller that is connected to the control input and receives control power.
a control power circuit configured to receive the dc bus and provide a control power signal to the controller power input <u>including start up circuitry that provides control power independent of the input magnitude at start-up, and from after start up circuitry that is used to provide control power only after start-up</u>.	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides control power to the controller. The control power circuit includes start up circuitry that provides control power independent of the input magnitude at start-up, and after start up circuitry that is used to provide control power only after start-up.

CLAIM CHART ATTACHED TO DECLARATION OF MICHAEL MADSEN IN SUPPORT OF RESPONSE TO ACP FOR U.S. PATENT NOS. 6,329,636, 6,815,639 and 6,987,242

35. (Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
receiving a dc bus having a dc magnitude;	The Miller MaxStar® 150 includes a dc bus.
providing an output power signal derived from the dc bus, wherein the output power signal is a welding type output; and	The Miller MaxStar® 150 provides welding output power derived from the dc bus.
converting the dc bus into control power using start up circuitry that provides control power independent of the input magnitude at start-up, and from after start up circuitry that is used to provide control power only after start-up, wherein the control power has a control power magnitude independent of the dc magnitude; and	The Miller MaxStar® 150 converts the dc bus into control power using start up circuitry that provides control power independent of the input magnitude at start-up, and using after start up circuitry that is used to provide control power only after start-up. The control power has a power magnitude independent of the dc magnitude.
providing the control power to a controller configured to control the output power.	The Miller MaxStar® 150 provides the control power to a controller configured to control the output power.
36. A method of starting to provide welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
receiving an input power signal having an input frequency and an input magnitude;	The Miller MaxStar® 150 receives input power.
providing a first dc signal having a first dc magnitude responsive to the input magnitude;	The Miller MaxStar® 150 provides a rectified signal having a magnitude responsive to the input magnitude
deriving a second dc voltage having a second dc magnitude less than the first dc magnitude using start up circuitry at start up and using other circuitry only after start up and controlling a control converter with the second dc voltage to produce a control dc voltage;	The Miller MaxStar® 150 derives a control signal having dc magnitude less than the rectified magnitude using start up circuitry at start up and using other circuitry only after start up. A converter is controlled with the control signal, so that it produces a control dc voltage;

controlling an output converter with the control dc voltage to produce an output signal.	The Miller MaxStar® 150 controls an output converter with the control dc voltage to produce an output signal.
Patent 6,815,639	
1. (Twice Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
an input circuit configured to receive an input power signal <u>from the range, wherein the range includes at least two utility input voltages spanning a factor of at least 1.5</u>, having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 includes an input rectifier that can receive input power from the range of 115V ac to 230Vac. The rectifier provides a rectified signal with a magnitude responsive to the input magnitude.
a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a preregulator that receives the rectified signal and provides a dc bus. The dc bus has a magnitude independent of the input magnitude.
an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input <u>magnitude</u> [voltage];	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output. The welding output has a frequency and magnitude independent of the input frequency and magnitude.
a preregulator controller, connected to the preregulator, and further having a controller power input;	The Miller MaxStar® 150 includes a preregulator controller that is connected to the preregulator and has a controller power input.

and a control power circuit configured to receive the dc second signal and provide a controller [control] power signal to the controller power input, wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency, and further wherein the control power circuit has a switch and start-up circuitry, wherein the start-up circuitry includes control circuitry, and further wherein the start up circuitry provides control power independent of the input magnitude at start-up, and further having after start up circuitry that provides control power after start up and is not used to provide control power at start-up.	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides a control power signal to the controller. The control power signal has a magnitude and frequency independent of the input magnitude and frequency independent. The control power circuit includes has a switch and start-up circuitry. The start-up circuitry includes control circuitry that provides control power independent of the input magnitude at start-up, and has after start up circuitry that provides control power after start up that is not used to provide control power at start-up.
10. (Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
receiving an input power signal having an input frequency and an input magnitude; providing a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 includes a rectifier that receives input power and provides a rectified signal at a magnitude responsive to the input magnitude.
converting the first signal into a dc second signal having a second magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a boost converter that converts the rectified signal into a dc bus at magnitude independent of the input magnitude.
providing an output power signal derived from the dc second signal, wherein the output power signal is a welding type output and has an output frequency independent of the input frequency and further has an output voltage independent of the input magnitude [voltage];	The Miller MaxStar® 150 includes an output circuit that provides welding power derived from the dc bus. The output power has an output frequency and magnitude independent of the input frequency and magnitude.

converting the dc second signal into control power, wherein the control power has a control power magnitude independent of the input magnitude, and wherein the control power is derived from a circuit that is controlled and receives power from a first set of circuit elements at start-up for any input voltage in the range of input voltages, and from a second set of circuit elements only after start-up.	The Miller MaxStar® 150 includes control power circuitry that converts the dc bus into control power. The control power has a magnitude independent of the input magnitude. The control power circuitry includes is controlled and receives power from a first set of circuit elements at start-up for any input in the range of input voltages, and from a second set of circuit elements only after start-up.
20. A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding power from a range of input voltages and frequencies.
input means for receiving an input power signal having an input frequency and an input magnitude and for providing a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 includes a rectifier that receives input power and provides a rectified signal at a magnitude responsive to the input magnitude.
converting means for converting the first signal into a dc second signal having a magnitude independent of the input magnitude, wherein the converting means is connected to receive the first signal;	The Miller MaxStar® 150 includes a boost converter that converts the rectified signal into a dc bus at magnitude independent of the input magnitude.
means for providing a welding type output power signal derived from the dc second signal, wherein the output power signal and has an output frequency independent of the input frequency and-further has an output voltage independent of the input voltage, and wherein the means for providing an output power signal is disposed to receive the dc second signal;	The Miller MaxStar® 150 includes an output circuit that provides welding power derived from the dc bus. The output power has an output frequency and magnitude independent of the input frequency and magnitude.

means for converting the dc second signal into control power, wherein the control power has a control power magnitude independent of the input magnitude; and means for providing power to a circuit that provides the control power from a first set of circuit elements at start-up, and from a second set of circuit elements after start-up.	The Miller MaxStar® 150 includes control power circuitry that converts the dc bus into control power. The control power has a magnitude independent of the input magnitude. The control power circuitry includes is controlled and receives power from a first set of circuit elements at start-up for any input in the range of input voltages, and from a second set of circuit elements only after start-up.
29. (Amended) A welding type power source capable of receiving any input voltage and input frequency in a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving any input voltage and input frequency in a range of input voltages and frequencies.:
a dc bus;	The Miller MaxStar® 150 includes a dc bus.
an output circuit configured, having a control input and to receive the dc bus and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input voltage;	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides welding power. The output power has an output frequency and magnitude independent of the input frequency and magnitude.
a controller, connected to the control input and further having a controller power input;.	The Miller MaxStar® 150 includes a controller, connected to the control input and having a controller power input.
and a control power circuit configured to receive the dc bus and provide a control power signal to the controller power input, wherein the control power circuit is further configured to receive power from a first set of circuit elements at start-up for any input voltage within the range and a second set of circuit elements only after start-up	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides a control power signal to the controller. The control power circuit is receives power from a first set of circuit elements at start-up for any input voltage within the range and a second set of circuit elements only after start-up.

CLAIM CHART ATTACHED TO DECLARATION OF MICHAEL MADSEN IN SUPPORT OF RESPONSE TO ACP FOR U.S. PATENT NOS. 6,329,636, 6,815,639 and 6,987,242

34. A method of providing welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 provides welding type power from a range of input voltages and frequencies.
receiving a dc bus having a dc magnitude;	The Miller MaxStar® 150 has a dc bus.
providing an output power signal derived from the dc bus, wherein the output power signal is a welding type output; and	The Miller MaxStar® 150 includes an output circuit that provides welding output power.
converting the dc bus into control power, wherein the control power has a control power magnitude independent of the dc magnitude, and wherein the control power is derived from a first set of circuit elements at start up and from a second set of circuit elements <u>only</u> after start-up <u>for any input voltage within the range</u>; and	The Miller MaxStar® 150 includes a control power circuit that converts the dc bus into control power that has a magnitude independent of the dc bus magnitude. The control power is derived from a first set of circuit elements at start up and from a second set of circuit elements only after start-up for any input voltage within the range.
providing the control power to a controller configured to control the output power.	The control power circuit provides the control power to a controller configured to control the output power.
Patent 6,987,242	
1. (Twice Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
an input circuit configured to receive an input power signal having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 includes an input circuit that receives input power and provides a rectified signal having a magnitude responsive to the input magnitude.
a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a preregulator that receives the rectified signal and provides a dc bus at a magnitude independent of the input magnitude.

an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input magnitude [voltage];	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.
a preregulator controller, connected to the preregulator, having a power factor correction circuit, and further having a controller power input; [and]	The Miller MaxStar® 150 includes a controller, connected to the preregulator, that has a power factor correction circuit, and a controller power input.
a control power circuit configured to receive the dc second signal and provide a controller [control] power signal to the controller power input, wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency;	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides control power to the controller. The control power has a frequency and magnitude independent of the input magnitude and frequency.
wherein the control power circuit includes a first set of circuit elements used to derive control power at start up independent of the input magnitude and a second set of circuit elements used to derive control power only after start-up; and	The control power circuit includes a first set of circuit elements that derive control power at start up, independent of the input magnitude, and a second set of circuit elements that derive control power only after start-up.
providing the control power to a controller configured to control the output power.	The control power is provided to a controller for the output power.
10. (Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
receiving an input power signal having an input frequency and an input magnitude;	The Miller MaxStar® 150 includes an input circuit that receives input power.

providing a first signal having a magnitude responsive to the input magnitude;	The input circuit provides a rectified signal having a magnitude responsive to the input magnitude.
converting and power factor correcting, by controlling a switch, the first signal into a dc second signal having, a second magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a preregulator that converts the rectified signal into a dc bus at a magnitude independent of the input magnitude. The preregulator power factor corrects the rectified signal by controlling a switch.
providing an output power signal derived from the dc second signal, wherein the output power signal is a welding type output and has an output frequency independent of the input frequency and further has an output voltage independent of the input <u>magnitude</u> [voltage]; and	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.
converting the dc second signal into control power <u>using a first set of circuit elements to derive control power at start up and a second set of circuit elements to derive control power only after start-up; and</u>	The Miller MaxStar® 150 includes includes a control power circuit that includes a first set of circuit elements that derive control power at start up, and a second set of circuit elements that derive control power only after start-up.
wherein the control power has a control power magnitude independent of the input magnitude.	The control power has a magnitude independent of the input magnitude.
19. (Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
input means for receiving an input power signal having an input frequency and an input magnitude and for providing a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 includes an input circuit that receives input power and provides a rectified signal having a magnitude responsive to the input magnitude.

converting means for converting, and power factor correcting by controlling a switch, the first signal into a dc second signal having magnitude independent of the input magnitude wherein the converting means is connected to receive the first signal;	The Miller MaxStar® 150 includes a preregulator that converts the rectified signal into a dc bus at a magnitude independent of the input magnitude.
means for providing a welding type output power signal derived from the dc second signal, wherein the output power signal [and] has an output frequency independent of the input frequency and further has an output voltage independent of the input <u>magnitude</u> [voltage], and wherein the means for providing an output power signal is disposed to receive the dc second signal;	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.
means for converting the dc second signal into control power<u>, including a first set of circuit elements to derive control power at start up and a second set of circuit elements to derive control power only after start-up</u>, wherein the control power has a control power magnitude independent of the input magnitude.	The Miller MaxStar® 150 includes a control power circuit that converts the dc bus and provides control power to the controller. The control power has a frequency and magnitude independent of the input magnitude and frequency. The control power circuit includes a first set of circuit elements that derive control power at start up, independent of the input magnitude, and a second set of circuit elements that derive control power only after start-up.
28. (Twice Amended) A welding type power source capable of receiving <u>any input voltage and input frequency in</u> a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
a dc bus;	The Miller MaxStar® 150 has a dc bus.

an output circuit configured, having a control input and to receive the dc bus and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input voltage;	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.
a controller, including a power factor correction circuit, connected to [the] <u>a</u> control input and further having a controller power input;	The Miller MaxStar® 150 includes a controller, connected to the preregulator, that has a power factor correction circuit, and a controller power input
and a control power circuit configured to receive the dc bus and provide a control power signal to the controller power input<u>, having a first set of circuit elements to derive control power at start up from the range of input voltages and a second set of circuit elements to derive control power only after start-up</u>.	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides control power to the controller. The control power circuit includes a first set of circuit elements that derive control power at start up, and a second set of circuit elements that derive control power only after start-up.
33. (Amended) A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
an input circuit configured to receive an input power signal having an input frequency and an input magnitude and provide a first signal having a magnitude responsive to the input magnitude	The Miller MaxStar® 150 includes an input circuit that receives input power and provides a rectified signal having a magnitude responsive to the input magnitude.
a preregulator configured to receive the first signal and provide a dc second signal having a preregulator magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a preregulator that converts the rectified signal into a dc bus at a magnitude independent of the input magnitude.
an output circuit configured to receive the dc second signal and provide a welding type output power signal having an output frequency independent of the input frequency and having an output voltage independent of the input <u>magnitude</u> [voltage];	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.

a preregulator controller, connected to the preregulator, and further having a controller power input; and	The Miller MaxStar® 150 includes a controller, connected to the preregulator, that has a controller power input.
a control power circuit configured to receive the dc second signal and provide a control power signal to the controller power input, wherein the controller power signal has a control power magnitude independent of the input magnitude and a control frequency independent of the input frequency, without reconfiguring the control power circuit <u>and having a first set of circuit elements to derive control power at start up from the range of input voltages and a second set of circuit elements to derive control power only after start-up</u>	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides control power to the controller without reconfiguring the control power circuit. The control power has a frequency and magnitude independent of the input magnitude and frequency. The control power circuit includes a first set of circuit elements that derive control power at start up, and a second set of circuit elements that derive control power only after start-up. controller for the output power.
42. (Amended) A method of providing welding type power from a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
receiving an input power signal having an input frequency and an input magnitude;	The Miller MaxStar® 150 includes an input circuit that receives input power.
providing a first signal having a magnitude responsive to the input magnitude;	The input circuit provides a rectified signal having a magnitude responsive to the input magnitude.
converting the first signal into a dc second signal having a second magnitude independent of the input magnitude;	The Miller MaxStar® 150 includes a preregulator that converts the rectified signal into a dc bus at a magnitude independent of the input magnitude.
providing an output power signal derived from the dc second signal, wherein the output power signal is a welding type output and has an output frequency independent of the input frequency and further has an output voltage independent of the input <u>magnitude</u> [voltage]; and	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.

converting the dc second signal into control power, without reconfiguring a control power circuit, wherein the control power has a control power magnitude independent of the input magnitude using a first set of circuit elements to derive control power at start up and a second set of circuit elements to derive control power only after start-up.	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and provides control power. The control power has a frequency and magnitude independent of the input magnitude and frequency. The control power circuit includes a first set of circuit elements that derive control power at start up, and a second set of circuit elements that derive control power only after start-up.
51. A welding type power source capable of receiving a range of input voltages and frequencies, comprising:	The Miller MaxStar® 150 is a welding power source capable of receiving a range of input voltages and frequencies.
input means for receiving an input power signal having an input frequency and an input magnitude and for providing a first signal having a magnitude responsive to the input magnitude;	The Miller MaxStar® 150 includes an input circuit that receives input power and provides a rectified signal having a magnitude responsive to the input magnitude.
converting means for converting the first signal into a dc second signal having a magnitude independent of the input magnitude, wherein the converting means is connected to receive the first signal;	The Miller MaxStar® 150 includes a preregulator that converts the rectified signal into a dc bus at a magnitude independent of the input magnitude.
means for providing a welding type output power signal derived from the dc second signal, wherein the output power signal and has an output frequency independent of the input frequency and further has an output voltage independent of the input voltage, and wherein the means for providing an output power signal is disposed to receive the dc second signal	The Miller MaxStar® 150 includes an output circuit that receives the dc bus and provides a welding output at a frequency and magnitude independent of the input frequency magnitude.
means for converting the dc second signal into control power, without reconfiguring, wherein the control power has a control power magnitude independent of the input magnitude.	The Miller MaxStar® 150 includes a control power circuit that receives the dc bus and, without reconfiguring, provides control power. The control power has a frequency and magnitude independent of the input magnitude and frequency.

Exhibit E

#15

Appl. No. 09/969535

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Steven J. Geissler
Appl. No.	:	09/969535
Filing Date	:	October 1, 2001
Title	:	Method And Apparatus For Receiving A Universal Input Voltage In A Welding, Plasma Or Heating Power Source
Group/Art Unit	:	1725
Examiner	:	Shaw, C.
Docket No.	:	ITW 8637.60

Commissioner for Patents
Washington, D.C. 20231

DECLARATION OF PRIOR INVENTION IN THE UNITED STATES
OR IN A NAFTA OR WTO MEMBER COUNTRY
TO OVERCOME CITED PATENT OR PUBLICATION (37 C.F.R. § 1.131)

PURPOSE OF DECLARATION

1. This declaration is to establish completion of the invention of this application in the United States at a date prior to February 29, 2000, that is the effective date of the prior art patent that was cited by the applicant.

2. The person making this declaration is the inventor.

FACTS AND DOCUMENTARY EVIDENCE

3. To establish the date of completion of the invention of this application, a circuit diagram and printout showing the date of the diagram are submitted as evidence.

4. From these documents and/or models, it can be seen that the invention in this application was made at least by the date of February 23, 2000, which is a date earlier than the effective date of the reference.

TIME OF PRESENTATION OF THE DECLARATION

This declaration is submitted prior to final rejection.

5. As a person signing below:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

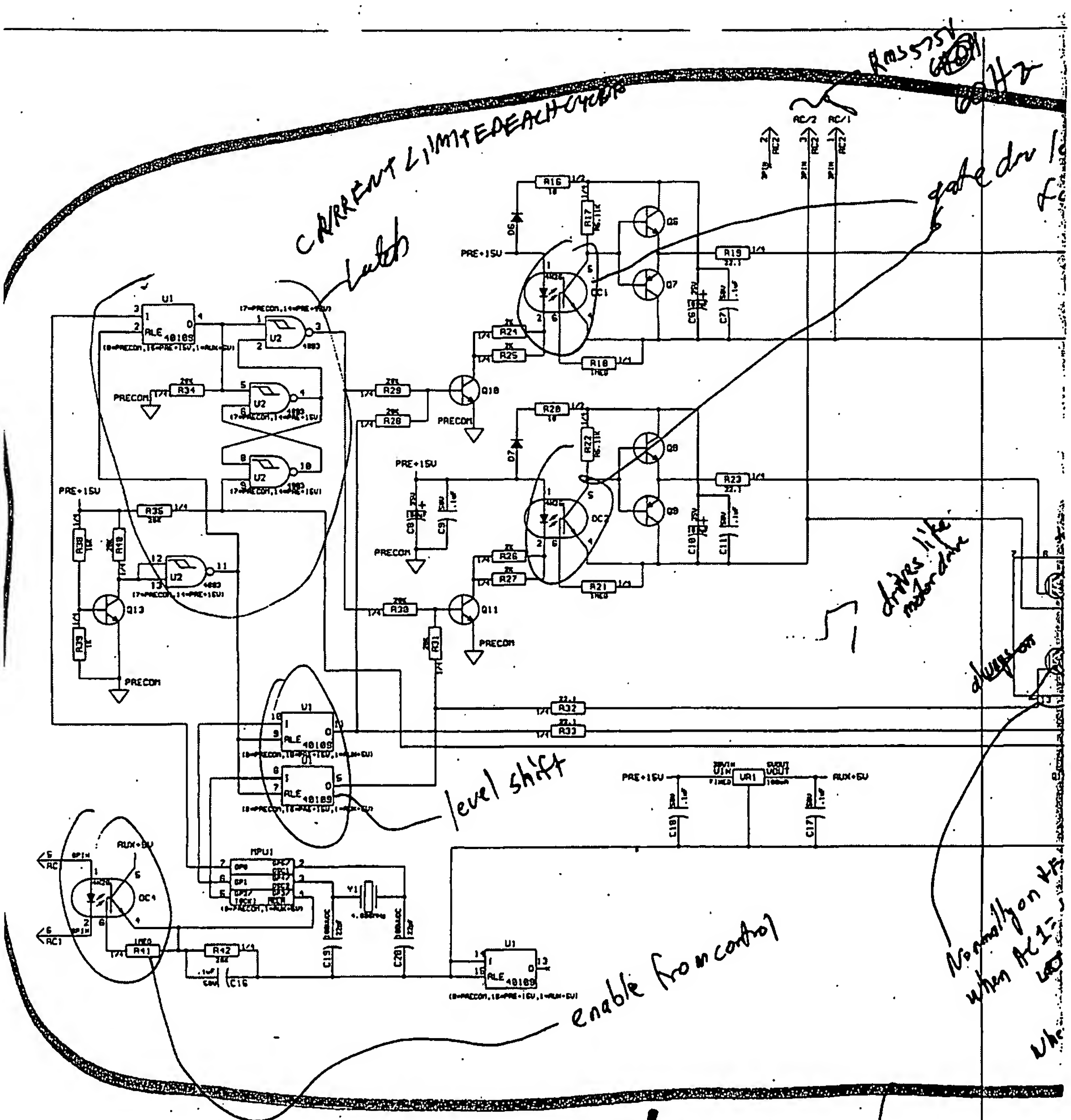
7. Inventor(s)

Inventor's signature Steve Geissler
Steven J. Geissler

Date 3-3-2003
Country of Citizenship: United States

Residence: 4713 Overhill Dr
Fort Collins, CO

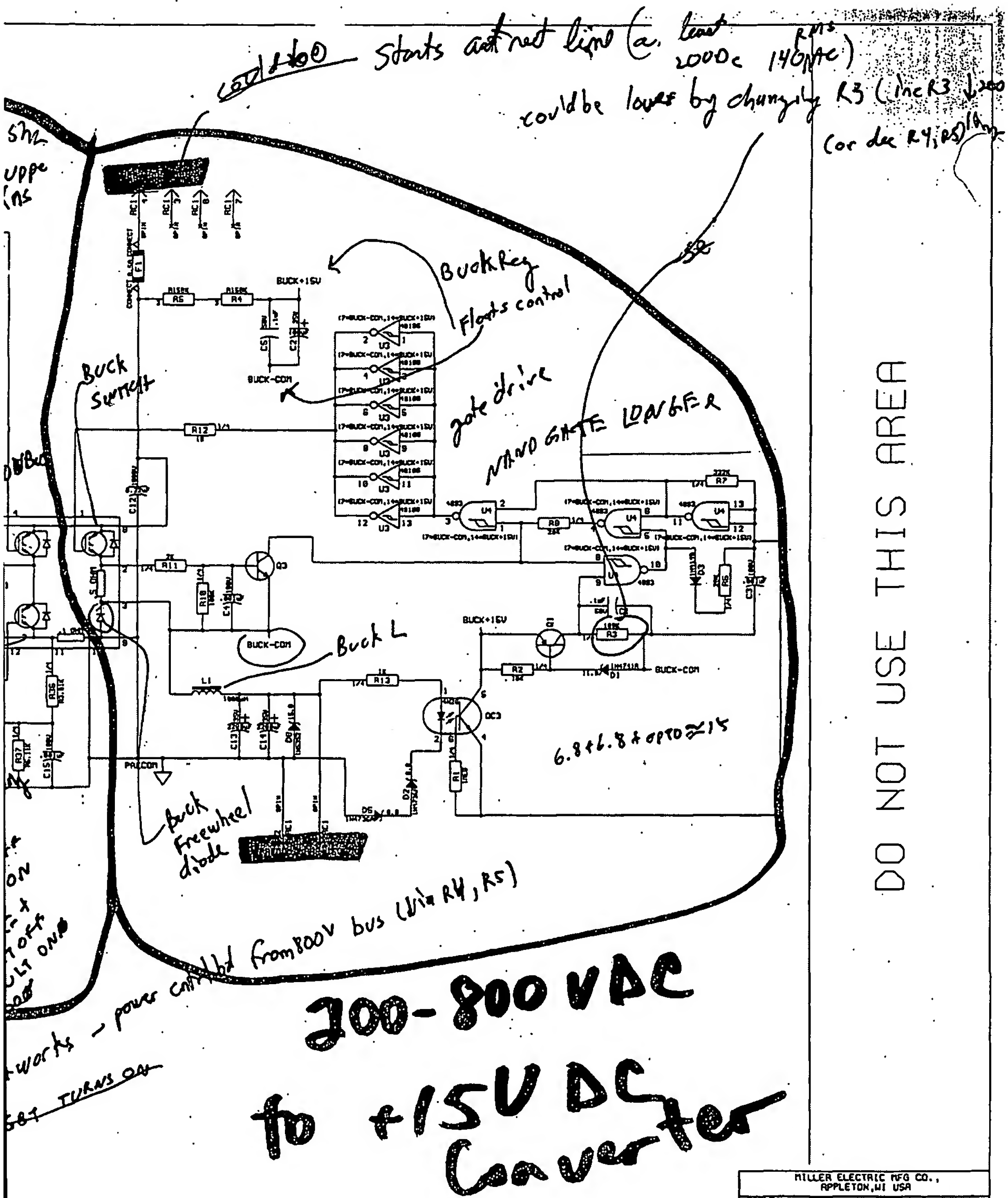
Post Office Address: (same)



60 Hz.
Aux.

has same peak as 575 (= 800)
same RMS

POWER/GROUND NETS FOR CHIPS	
MPU1	8=PRECOM,1=AUX+5V
U1	8=PRECOM,16=PRE+15V,1=AUX+5V
U2	7=PRECOM,14=PRE+15V
U3	7=BUCK-COM,14=BUCK+15V



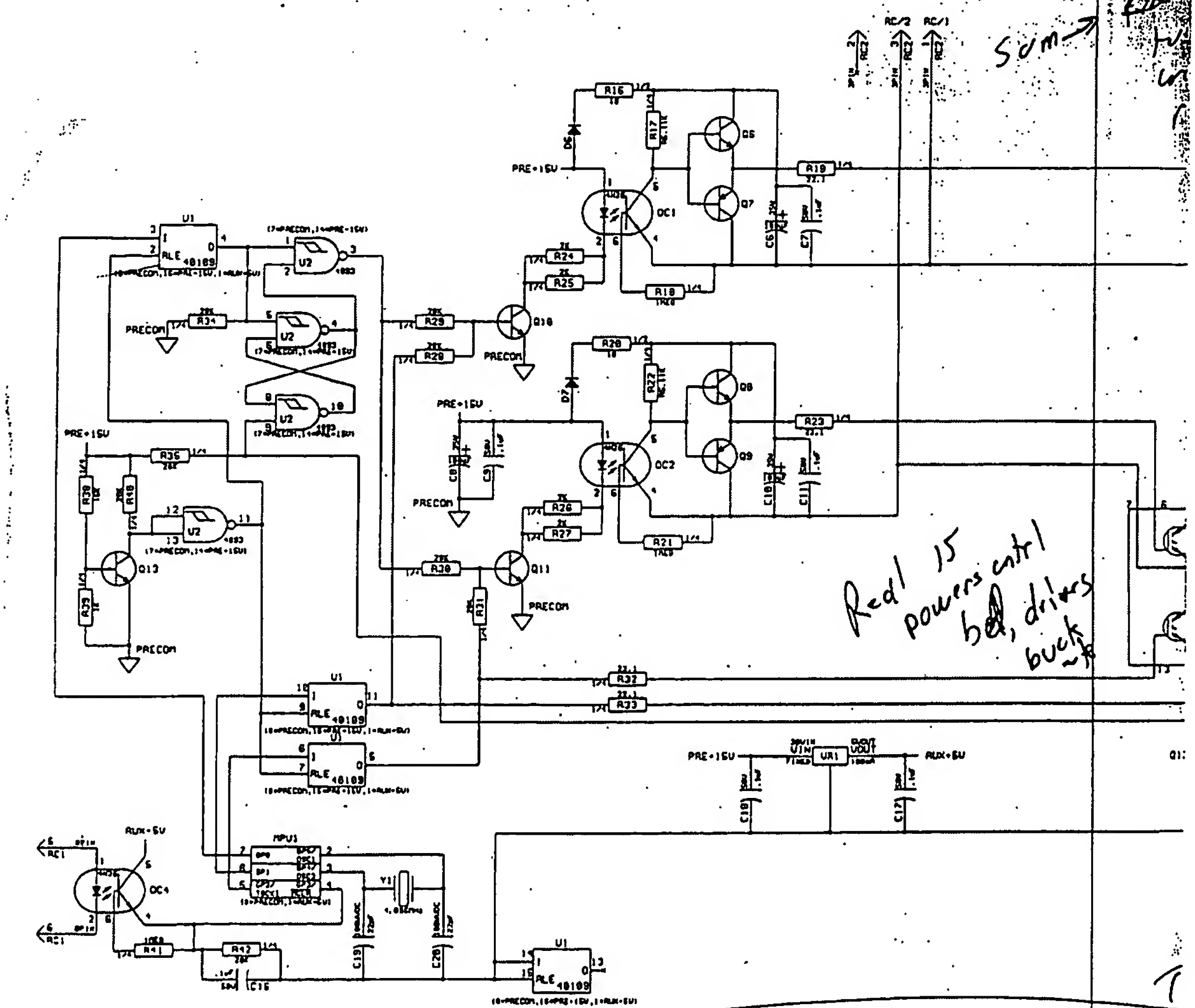
MILLER ELECTRIC MFG CO., APPLETON, WI USA

TITLE CKT, PRINTED WIRING BOARD, AUX 60Hz w/+15V (SEMIKRON-Module)

DRAWING NOT TO SCALE · CONFIDENTIAL

INDEX	REPLACES		
DRN BY YOU/ENG DATE MO-DA-YR	SIZE D	DWG. NO. 199425	REV X

REV	DATE	BY	ECO	REVISION DESCRIPTION



Sim →

Redl 15 powers cntrl bd, drivers buck

Latch released via Q8, C4 disch, trips etc

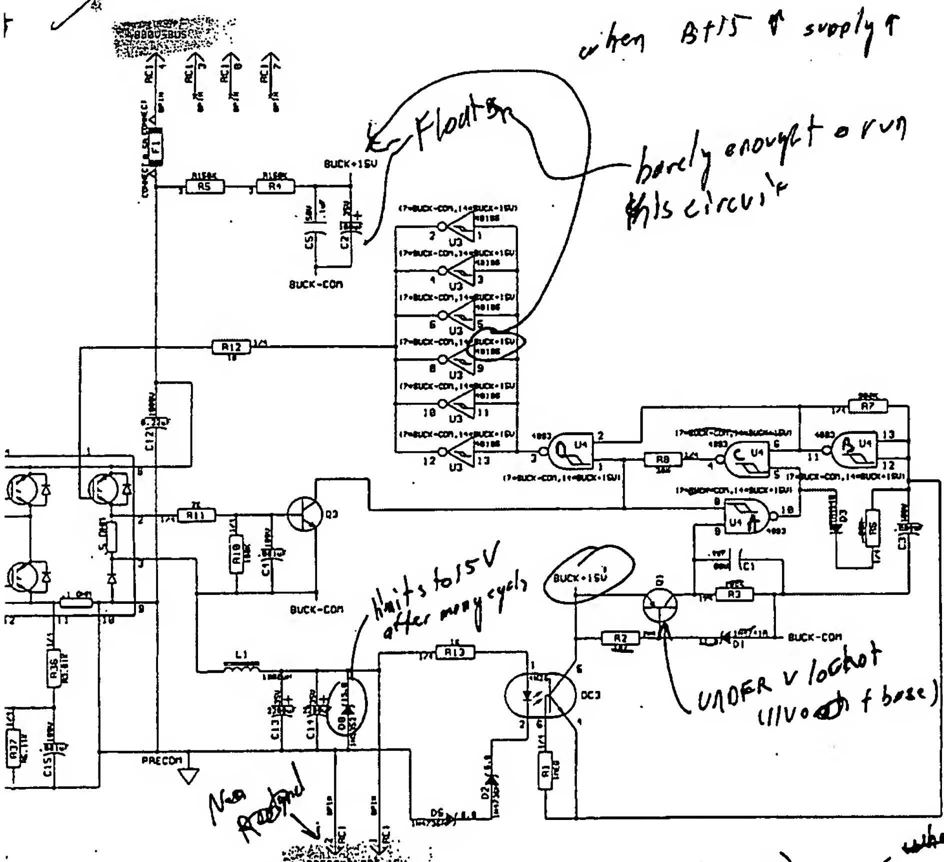
⇒ U43=0
⇒ DRIVE=1

POWER/GROUND NETS FOR CHIPS	
MPU1	8=PRECOM,1=AUX+5V
U1	8=PRECOM,16=PRE+15V,1=AUX+5V
U2	7=PRECOM,14=PRE+15V
U3	7=BUCK-COM,14=BUCK+15V

BS,
ff BS

Repeat until ~~[illegible]~~ C13V = 15 which
OPTO STOPS becaus PIN4 OPTO lifts C3 which turns off U43 — smooth, off time gets longer thus

when B+15 ↑ supply ↑



DO NOT USE THIS AREA

when U4A goes low when lockout ends

1 ON – 800 V BUS RISES TO 200
– Bleeding thru R4, R5 raises supply gate (B+15)
– when buck +15 reaches ~11.7 Q1 turns on
– This enable logic
– logic is a timer w/logic
Gate B RC is long (R7)
AS L1 I ↑ R11, R10, C4 turns Q3 & Turns off Buck switch
when Q3 is on U48 = 0 & U41 = 0
~~when~~ U48 ~~[illegible]~~ → 0, then U410 → 1
when U410 = 1 → U4 9 = 0, latches off

U4A = 1 at start (lockout)
U4B = 0 at start
DIODE D3 locks into 1 state (B=0)
⇒ U43 = 1 ⇒ TRAN = OFF
WHEN U4A → D C3 discharges, eventually
B → 1
~~THEN [illegible]~~ A→0 latches thru
NOW ENABLED LATCH
U42 = 1, U40 = 1

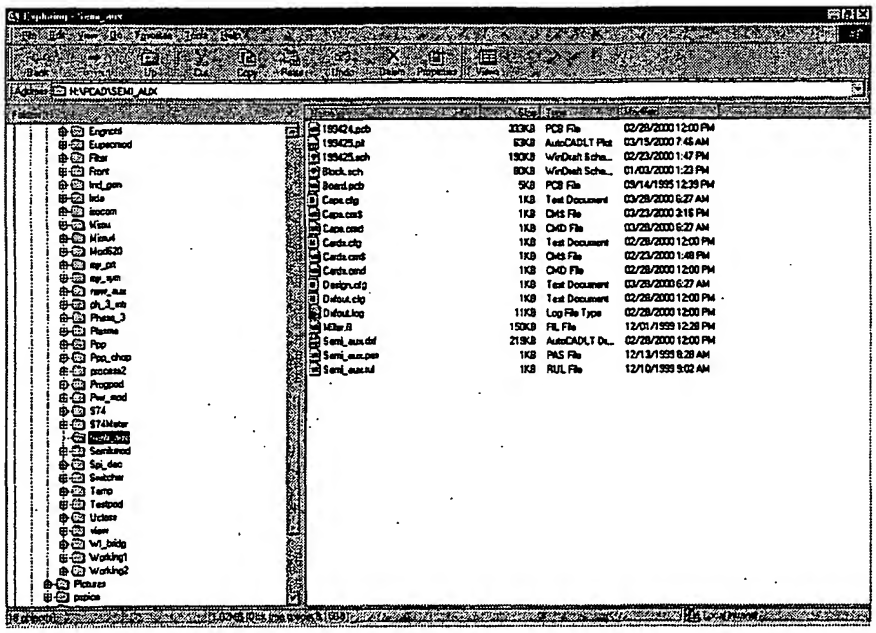
REV	DATE	BY	ECO	REVISION DESCRIPTION

MILLER ELECTRIC MFG CO., APPLETON, WI USA

TITLE CKT, PRINTED WIRING BOARD, AUX 60Hz w/15U (SEMIKRON-Module)

DRAWING NOT TO SCALE | CONFIDENTIAL
INDEX | REPLACES
DRN BY YOU/ENG DATE MO-DA-YR | SIZE D | DWG. NO. 199425 | REV X

Exhibit F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Block.sch 80KB WinDraft Scha... 01/03/2000 1:23 PM
Board.pcb 5KB PCB File 09/14/1999 12:39 PM
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Capa.cmd 1KB CMD File 03/28/2000 6:27 AM
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Cards.cm$ 1KB CM$ File 02/23/2000 1:48 PM
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Design.clg 1KB Text Document 03/28/2000 6:27 AM
Dxfout.clg 1KB Text Document 02/28/2000 12:00 PM
Dxfout.log 11KB Log File Type 02/28/2000 12:00 PM
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